EFFECTIVENESS OF MUSCLE STRENGTHENING EXERCISES ON JOINT PAIN AND PHYSICAL FUNCTION AMONG OLD AGE PEOPLE WITH OSTEOARTHRITIS IN ST. JOSEPH HOME FOR AGED AND DESTITUTE, PODANUR, AT COIMBATORE

A DISSERTATION SUBMITTED TO THE TAMILNADU DR. MGR MEDICAL UNIVERSITY, CHENNAI IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING

2010-2012

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ABSTRACT

"Old age is like everything else, To make a success of it, you've got to start young"

Age related changes affect every body system. These changes are normal and occur as people age. Older people generally lose muscle strength as they age. This reduction in muscle strength and associated joint pain makes the older people more likely to have problems carrying out their daily activities . Muscle Strengthening exercises helps to reduce joint pain and improve the physical function.

The present study was conducted to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St. Joseph Home for aged and destitute, at Coimbatore.

Conceptual framework for the study has been based on modified Wiedenbech's helping art of clinical nursing theory. The research design used was one group pre test and post test pre experimental design. Non probability purposive sampling technique was used to select 50 samples for the study. Muscle Strengthening exercises are practiced by samples for 30-45 minutes daily in the morning and evening for 30 days . The level of joint pain and physical function before and after muscle strengthening exercises and the association between the post test level of joint pain and physical function with the selected demographic variables were assessed among old age people with osteoarthritis . The data gathered were analyzed using descriptive and inferential statistics.

With regard to joint pain, the mean post test scores of joint pain 3.3(SD $\pm$ 1.129)which was significantly lower than the mean pretest scores 7.78(SD $\pm$ 1.17). The mean post test scores of physical function

38.86 (SD $\pm$ 9.038) which was significantly higher than the mean pretest scores 25.1(SD$\pm$ 2.332). The 't' value of joint pain score was 36.721 and physical function score was 11.632 which was significant at < 0.05 level. There was no significant association between post test scores of joint pain with the selected demographic variables at 0.05 level. There was no significant association between post test scores of physical function with the selected demographic variables except for duration of illness (χ^2=16.992) at 0.05 level.

The study findings revealed that there is a significant reduction of joint pain and improved physical function after muscle strengthening exercises. Based on the statistical findings it was evident that muscle strengthening exercises reduce the joint pain and improve physical function among old age people with osteoarthritis thereby it promotes the well being and quality of life among old age people with osteoarthritis

CHAPTER – I

INTRODUCTION

Good health is the pre requisite for
Good quality of life, ''Adding life to years "

WHO (2007)

BACKGROUND OF THE STUDY:

A lost common aspect in every culture is health. Some older definitions stated health as "Absence of disease". The ancient Indians and Greeks consider health as normal body equilibrium and disease as disturbance in body equilibrium.

Health is fundamental to the nation's progress in any sphere health as a positive state of well being in which harmonious development of mental and physical capacities of the individual leads to the enjoyment of a rich and full of life. That is adjustment to the total environment physical and social.

Kaur.L .et.al., (2009)

Wellness is the quality or condition of well being even among people with chronic illness, especially of being robust, healthy and fit . Wellness is not simply the absence of clinical manifestations, it incorporates positive mental, physical and spiritual well- being. High level wellness is a method of functioning oriented toward maximizing individual potential within the environment.

Black. J. et.al.,(2005)

Illness is a state in which a person's physical, emotional, intellectual, social developmental or spiritual functioning is diminished or impaired compared with previous experience.

Perry .P.,(2005)

The growth in the older population is expected to continue during this century and by 2030 there will be 71.5 million older adults representing 20% of the population.

Lewis et.al., (2007)

Age related changes affect every body system. These changes are normal and occur as people age. However, the age at which specify change become evident differs from person to person and within same person.

Lewis et.al., (2007)

Musculoskeletal and neurologic systems are essential for the maintenance of safe morbidity and reference of ADLs(activities of daily living) and IADLs(Instrumental activities of daily living) which allows older adults to remain independent and live in the community. Age- related changes that affect morbidity include alterations in bone remodeling leading to decreased bone density, loss of muscle mass, deterioration of muscle fibers and cell membranes, and generation in the function and efficiency of joints.

Suddarth's. B., (2008)

Musculoskeletal system changes: **muscle-** decreased number and diameter of muscle cell; replacement of muscle cells by fibrous connective tissue. The main findings, decreased muscle strength, increased rigidity in neck, shoulders, hip and knees.

Joints- Increased risk for cartilage erosion that contributes to direct contact between bone ends and overgrowth of bone around joint margins. The findings are joint stiffness, deceased mobility, limited range of motion, possible crepitation on movement, pain with motion and / or weight bearing.

Lewis et.al., (2007)

Women experience symptoms associated with menopause and have increased risk of atherosclerosis and osteoporosis due to decline in estrogen secretion.

Lewis et.al.,(2007)

Obesity is an important risk factor for lower extremity joint symptoms and disability caused by knee and hip OA As many as one-half of obese older individuals have clinically significant with knee or hip symptoms.

Michael C. Nevitt.,(2002)

Knee osteoarthritis is a common cause of leg pain in men. Osteoarthritis can develop in any joint in the body, common locations for this condition include the knees, hips and spine. The exact cause of knee osteoarthritis is not known, although certain factors may play a role in its development, including most conventional footwear, the aging process, joint injury or trauma, heredity, muscle weakness and imbalances and obesity.

Anne C.et.al.,(2009)

Excessive use of stress on joints have been identified as accelerating osteoarthritic changes (example; on the knees of football players and the feet and ankle in ballet dancers).

Basavanthappa. BT.,(2003)

Drug treatment is generally the first and most widely used treatment modality to control geriatric pain. It is relatively simple to implement and consists of NSAIDs, muscle relaxants, opioids, and other adjuvant therapy. Acetaminophen should be considered as initial and ongoing pharmacotherapy in the treatment of persistent pain, particularly musculoskeletal pain, owing to its demonstrated effectiveness and good safety profile.

Michael C. Nevitt.,(2002)

Application of heat and cold may reduce complaints of pain and stiffness.

Lewis.et.al.,(2007)

Person with good lifestyle changes may limit osteoarthritis symptoms. It is suggested that if women make effort to reduce weight, it may lessen the risk for osteoarthritis in the knee. It is always recommended to do regular exercise. It may help to build up the muscles and potentially stimulate cartilage growth. Person must keep away from high-impact sports. By regulating diet, person can alleviate the symptoms of osteoarthritis. Antioxidant vitamins C and E may provide some protection. Vitamin D and calcium are recommended for strong bones.

Dr. Jameel.,(2011)

Patients over 65 years of age with knee osteoarthritis (OA) who engage in regular Tai Chi exercise improve physical function and experience less pain. Tai Chi (mind-body approach) is a traditional style of Chinese martial arts that features slow, rhythmic movements to induce mental relaxation and enhance balance, strength, flexibility, and self-efficacy.

Chenchen Wang.et.al.,(2008)

Exercise reduces joint pain and stiffness, and increase flexibility, muscle strength, and endurance. It also helps with weight reduction and contributes to an improved sense of wellbeing.

Delaune et. al., (2006)

Exercise is recognized as a mainstay treatment of arthritis, yet more than 40% of adults with arthritis report no leisure time physical activity participation. The Centers for Disease Control and Prevention is working to identify and promote evidence-based physical activity programs to improve physical function among adults with arthritis.

-Br J Sports Med.,(2009)

NEED FOR THE STUDY:

The number of people older than 65 will double to 14 percent from 7 percent of the world's population in the next 30 years, rising to 1.4 billion by 2040 from about 506 million in the middle of last year, said the report, "An Aging World 2008," commissioned by the U.S.

Waters R., (2009)

Osteoarthritis is the most common type of joint disease, affecting over 20 million individuals in the United States alone.

Lozada C.et.al.,(2011)

In 1981, eight per cent of the population was over age of 65. In 2011, 13 per cent is over the age of 65. By 2031, 25 percent of Canada's population will be over the age of 65.

Mackay C.,(2011)

The population of the UK is ageing. The proportion of people aged over 65 rose from 15% to 17% from 1985-2010, an increase of 1.7m people, and is projected to reach 23% by 2035.

Samuel M.,(2011)

The ageing population in China over 60 years old reached 167 million in 2009, making up 12.5 percent of the total population.

Chunzhe Z ., (2010)

New York State is home to the third largest elderly population in nation. Currently there are 2.4 million are over the age of 65 in New York and that number is only expected to grow.

Fran O'Sullivan.,(2011)

Prevalence of knee symptoms and radiographic and symptomatic knee osteoarthritis in African Americans and Caucasians. Knee symptoms were present in 43%, 28% had radiographic knee OA, 16% had symptomatic knee

OA, and 8% had severe radiographic knee OA. Prevalence was higher in older individuals and women.

Jordan JM.et.al.,(2008)

The prevalence of osteoarthritis in elderly Japanese villagers was 38.3%, whereas that of osteoporotic vertebral fractures.

Journal of Orthopaedic Surgery.,(2006)

During a one year period 25% of people over 55 years have a persistent episode of knee pain, of whom about one in six in the UK and the Netherlands consult their general practitioner about it in the same time period. The prevalence of painful disabling knee osteoarthritis in people over 55 years is 10%, of whom one quarter are severely disabled.

G Peat .et.al.,(2000)

Joint pain is extremely common in older people, but its natural history has been little described in the UK literature. Some degree of joint pain was reported by 83%. This was related to age and female gender. The presence of pain was strongly related to mobility, energy and sadness. Over 1yr, 18% acquired or had increased frequency of pain, while 14% had reduced frequency of pain.

I.P. Donald.et.al.,(2004)

Prevalence of physician-diagnosed OA in British columbia was slightly lower than self-reported prevalence of arthritis in population surveys. The overall prevalence of OA in 2001 was 10.8%: 8.9% in men and 12.6% in women. Prevalence was higher in women in all age groups. By age 70–74 years, about one-third of men and 40% of women had OA. Incidence rates in 2000-01 were 11.7 per 1000 person-years in the total population, 10.0 in men and 13.4 in women. Rates increased linearly with age between 50 and 80 years.

Jacek. A.et.al.,(2006)

Osteoarthritis is the common musculoskeletal disorder affecting Australians, the leading cause of pain and disability in the community. on the basis of international radiological survey data, the australian institute of health and welfare (aihw) estimated that there are some 27 000 new cases of radiological OA among women each year (peak rate of onset of 13.5 per 1000 population in the 65–74 years age group) and about 15,500 new cases among men (peak rate of 9.0 per 1000 in those aged 75 years and over).5 this means more than 40 000 new cases of radiological OA each year. Prevalence increases to 10% of men and 20% of women aged 45–65 years 8 and even further to more than 50% of women aged 85 years and over.

Lynette M.et.al.,(2004)

The prevalence of knee pain is high (32.2% in men and 58.0% in women) in this elderly community population in Korea. The prevalence of knee pain and its influence on physical function and quality of life (QOL), we examined 504 community residents of Chuncheon, aged ≥ 50 yr. The prevalence of knee pain was 46.2% (32.2% in men and 58.0% in women) and increased with age in women. Independent of knee OA and other confounding factors, subjects with knee pain have more than 5-fold increase in the risk of belonging to the worst lower extremity function compared to subjects without knee pain.

Korean J.et.al.,(2011)

India has not yet come out with an appropriate policy framework to provide social security for the elders. According to projections by the UN Population Division, there will be two elderly persons for every child in the world by 2050. This implies that the aged 60 and above, which currently constitute less than 20% of the population will account for 32% of the population by2050.

Central Chronicle.,(2006)

In India 5.3% of males and 4.8% of females are aged more than 65 years. The commonest obstacle for elderly to carry out ADL is the problem of

joint-pain and decreased mobility. Osteoarthritis is the most common articular disease of people 65 years and older.

Sharma MK. et.al.,(2007)

Morbidity Pattern among the elderly Population in the Rural area of Tamil Nadu, Globally there are an estimated 605 million people aged 60 years and above.

Anil Jacob purty. et.al.,(2005)

Lower extremity joint pain contributes to disability in middle and old age and describe patterns of severity in site-specific measures amongst those with multiple-site pain. Lower limb joint pain count was independently associated with reduced physical function after adjusting for a range of covariates. The severity of pain and disability attributed to each site increased as the number of painful sites increased.

Peat G.et.al., (2006)

Therapeutic exercise is beneficial for people with osteoarthritis (OA) of the hip or knee in terms of reduced joint pain, improved physical function. . For pain, combining the results revealed a mean moderate beneficial effect (SMD 0.46, 95% Cl 0.35, 0.57), while for self-reported physical function a mean small beneficial effect (SMD 0.33, 95% CI 0.23, 0.43) was found. Therapeutic exercise was shown to reduce pain and improve physical function for people with OA of the knee.

Fransen M.et.al.,(2002)

Patients with osteoarthritis (OA) of the knee or hip who adhere to the recommended home physical therapy exercises and physically active lifestyle experience more improvement in pain, physical function, and self-perceived effect according to a study from researchers in The Netherlands. Research also shows that maintenance of exercise behavior and physically active lifestyle

after discharge of physical therapy improves the long-term effectiveness of exercise therapy in patients with knee or hip OA.

Martijn F.et.al.,(2011)

People suffering from chronic knee pain may benefit from starting a daily home-based exercise program. The findings of this study suggest that following a specific exercise program for the knee may help reduce pain, decrease stiffness, and improve physical function.

Bastyr Center for Natural Health., (2011)

Physical therapy is must for the patient suffering from the problem of osteoarthritis and rheumatoid arthritis. It induces various exercises to increase muscle strength and also help in preserving the function. It also induces daily walking, using a cane or other supporting device.

Patients suffering from severe arthritis conditions have to move for total joint replacement. It is the last treatment option for joint pain.

Neil.J.Gonter.,(2008)

Exercise is one of the best things to help your knees by helping maintain range of motion and strengthening the muscles that support them. Research shows that even relatively minor increases in the strength of the quadriceps – the muscles that run along the front of the thigh – can help reduce the risk of knee osteoarthritis and its progression, and reduce pain.

Karen. (2011)

Isokinetic exercise is an effective and well-tolerated treatment for knee osteoarthritis.

Brian T.et.al.,(2004)

Muscle strengthening exercises to increase or maintain muscle, muscle tone and strength.

Basavanthappa .B T.,(2003)

The objective of this study was to evaluate the effectiveness of an exercise program conducted as part of community health services to improve pain and physical function in elderly people with Osteoarthritis of the knee. They were allocated randomly to the intervention group (h=44) and the control group (n=44) the exercise program classes of 90 min duration were held 8 times over 3 months. The effect of the intervention was 0.44 for WOMAC score, 0.23 for peak torque during knee extension 0.64 for knee flexion, 0.32 for Rom, 0.81 for standing ability and extension, 0.64 for knee flexion 1.13 for waking ability. These results suggested that the exercise program for elderly people with knee OA improved knee pain and physical function.

Oida Y. et.al., (2008)

The investigator visited the old age home. Old age home has no medical facilities and majority of the old age people are suffering from joint pain. They are not taking any treatment for joint pain. Due to discomfort, pain and impaired physical function in joints their activities of daily living are affected. They are worried about their problem. So, the investigator wanted to help the old age people with osteoarthritis. To practice exercises which is non expensive. So, the investigator felt a need to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis.

STATEMENT OF PROBLEM:

A study to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St.Joseph Home for aged and destitute, at Coimbatore.

OBJECTIVES:

1) To assess the pretest and post test level of joint pain among old age people with osteoarthritis

2) To assess the pretest and post test level of physical function among old age people with osteoarthritis
3) To compare the pre and post test level of joint pain among old age people with osteoarthritis
4) To compare the pre and post test level of physical function among old age people with osteoarthritis
5) To find the association between the post test level of joint pain among old age people with osteoarthritis and their selected demographic variables
6) To find the association between the post test level of physical function among old age people with osteoarthritis and their selected demographic variables

OPERATIONAL DEFINITIONS:

EFFECTIVENESS:

Effectiveness refers to the production of a desired or intended result.

Kindersley., (2007)

In this study, it refers to determine the extent to which the muscle strengthening exercises has brought about the significant difference between pre and post test level of joint pain and physical function scores which is measured by using statistical measurements and its scores.

MUSCLE STRENGTHENING EXERCISES:

Muscle strength has been defined as the ability to exert maximum force against resistance.

Hoeger .et.al., (1990)

-

In this study muscle strengthening exercises includes isometric exercise, isotonic exercise and isokinetic exercise to strengthen the muscles of shoulder,

elbow, knee, hip, and ankle. Muscle strengthening exercises duration of procedure is 30 -45 minutes daily in the morning and evening for 30 days.

Isometric Exercise:

Isometric exercise involves muscle contraction without shortening. (There is no movement or only a minimum shortening of muscle fibers).

Tylor.C. et.al., (2005)

In this study, Isometric exercise includes elbow flexion, shoulder abduction, knee extension, and ankle dorsiflexion exercise. The duration of isometric exercise is 12 minutes .In which each exercise is done for 3 minutes, daily in the morning and evening for 30 days.

Isotonic exercise:

Isotonic exercise involves muscle shortening and active movement.

Tylor.C. et.al.,(2005)

In this study, Isotonic exercise includes shoulder external rotation, straight leg raise with cuff weigh, Hip abduction, Hip extension, Knee extension. The duration of isotonic exercise is 15 minutes. In which each exercise is done for 3 minutes daily in the morning and evening for 30 days.

Isokinetic exercise:

Isokinetic exercise involves muscle contractions with resistance, varying at a constant rate produced by a device with a capacity for variable resistance.

Tylor.C. et.al.,(2005)

In this study, Isokinetic exercise is while in seated position on a chair with legs fully extended; make the thigh muscles tightened trying to push back the knee down towards the floor. Hold for 10 seconds, relax and then repeat. The duration of isokinetic exercise is 3 minutes. Exercise is done for 3 minutes daily in the morning and evening for 30 days.

JOINT PAIN:

Joint pain is defined as pain in one or more joints often caused by inflammation and infection.

University of Maryland Medical Center.,(2011)

In this study the unpleasant sensation perceived by old age people with osteoarthritis in the knee, which is measured by Numerical pain intensity scale.

PHYSICAL FUNCTION:

Physical function is defined as ability to perform ADL (activities of daily living) and IADL (Instrumental activities of daily living) and mobility tasks.

Jill a. benett., (2002)

In this study it refers to physical function of old age people with osteoarthritis includes walking, climbing stairs, sitting, standing, and lying which is measured by using WOMAC osteoarthritis index scale.

OSTEOARTHRITIS

Osteoarthritis is a slowly progressive non inflammatory disorder of the diarthrodial (synovial) joints.

Lewis et.al.,(2007)

OLD AGE PEOPLE WITH OSTEOARTHRITIS

Old age is defined as persons who are 65 years of age and older.

Lois white.,(2005)

In this study it refers to the people between 60-75 years who are diagnosed as osteoarthritis of the knee.

HYPOTHESES:

H_1 : The mean post test level of joint pain score is significantly lower than the mean pretest joint pain among old age people with osteoarthritis

H_2: The mean post test level of physical function score is significantly higher than the mean pretest physical function score among old age people with osteoarthritis .

H_3: There will be a significant association between the post test level of joint pain score among old age people with osteoarthritis and their selected demographic variables.

H_4: There will be a significant association between the post test level of physical function score among old age people with osteoarthritis and their selected demographic variables.

ASSUMPTIONS:

- Osteoarthritis is a common problem among geriatrics
- Osteoarthritis causes the joint pain, which limits the physical activity
- Nurses possess important role in reducing the joint pain and improving the physical function by providing muscle strengthening exercises among old age people with osteoarthritis.

DELIMITATIONS:

The study is delimited to

- Sample size was limited to 50
- Data collection period was only 5 weeks
- Study is delimited to selected old age home.

PROJECTED OUTCOME:

Muscle strengthening exercises can reduce the joint pain and improve the physical function among old age people with osteoarthritis. It promotes comfort and improves the activities of daily living .Develop the positive attitude to continue to practice the muscle strengthening exercises which helps to improve their quality of life.

(ii) CONCEPTUAL FRAMEWORK

Conceptual framework helps to express about ideas in a more reality, understandable, or precise form of the original conceptualization. The Conceptual framework for the this study was direction from Wiedenbach's helping art of clinical nursing theory (1964)

According to Ernestine Wiedenbech's nursing is nurturing and caring for someone in a motherly fashion. Nursing is a helping service that is rendered with compassion, skill and understanding to those in need for care, counsel and confidence in the area of health. The practice of nursing comprises a wide variety of services each directed toward the attainment of one of its three components.

Step 1: Identification of a need for help

Step 2: Ministration the help needed

Step 3: Validation that the need for help was met

Central Purpose:

According to theorist the nurse's central purpose defines the quality of health. She desires to effect or sustain in her patient and specifies what she recognizes to be her special responsibility in caring for the patient

In this study, the central purpose is to reduce the level of joint pain and improve physical function among old age people with osteoarthritis.

STEP I: Identification of a need for help

According to the theorist within the identification component there are four distinct steps. First, the nurse observes the patient, looking for an inconsistency between the expected behavior of the patient and the apparent behavior. Second, she attempts to clarify what the inconsistency means. Third, she determines the cause of inconsistency. Finally, she validate with the patient that her help is needed.

In this study, the demographic variables which comprises the age, sex, religion, marital status, educational status, duration of stay in old age home, number of children and duration of illness. Pre assessment of level of joint pain among old age people with osteoarthritis by using numerical pain intensity scale. Pre assessment of level of physical function among old age people with osteoarthritis by using WOMAC osteoarthritis index scale.

STEP II: Ministration the help needed

According to the theorist in ministry of the patient the nurse may give advice or information, make referral, apply a comfort measures or carry out the therapeutic procedure. The nurse will need to identify the cause and if necessary make an adjustment in the plan of action.

Ministration of help needed, it has two components,

a) Prescription
b) Realities

a) Prescription:

According to the theorist a prescription is a directive activity. It specifies both the nature of the action that will most likely lead to fulfillment of the nurse's central purposes and the thinking process that determines it.

In this study prescription is plan of care to achieve the purpose which includes administration of muscle strengthening exercises in reduction of level of joint pain and improving physical function among old age people with osteoarthritis. Muscle strengthening exercises includes isometric exercises for 12 minutes, isotonic exercises for 15 minutes, and isokinetic exercises for 3 minutes. The duration of muscle strengthening exercises is 30-45 minutes. It is continued for 30 days daily in the morning and evening

b) Realities:

According to the theorist, the realities of the situations in which the nurse is to provide nursing care. Realities consist of all factors- physical, physiological, emotional and spiritual that is at play in a situation in which nursing action occur at any given moment. Wiedenbech's defines the five realities as the agent, the recipient, the goal, the means, and the framework.

(i). Agent

According to theorist, the agent is the practicing nurse or her delegates is characterized by personal attribute, capacities, capabilities and most importantly commitment and competence in nursing

In this study, the investigator is the agent.

(ii) Recipient

According to theorist, the recipient is the patient, characterized by personal attribute, problems, capacities, aspirations, and most important, the ability to cope with the concerns or problems being experienced.

In this study, the recipients are old age people with osteoarthritis.

(iii) Goal

According to the theorist, the goal is the desired outcome the nurse wishes to achieve. The goal is the end result to be attained by nursing action.

In this study, it refers to reduce the level of joint pain and improve physical function among old age people with osteoarthritis.

(iv) Means

According to the theorist, the means comprises the activities and devices through which the practitioner is enabled to attain her goal. The mean include skills, techniques, procedures, and devices that may be used to facilitate nursing practices.

In this study, it refers to administration of muscle strengthening exercises by the researcher 30-45 minutes daily in the morning and evening for 30 days

(v) Framework

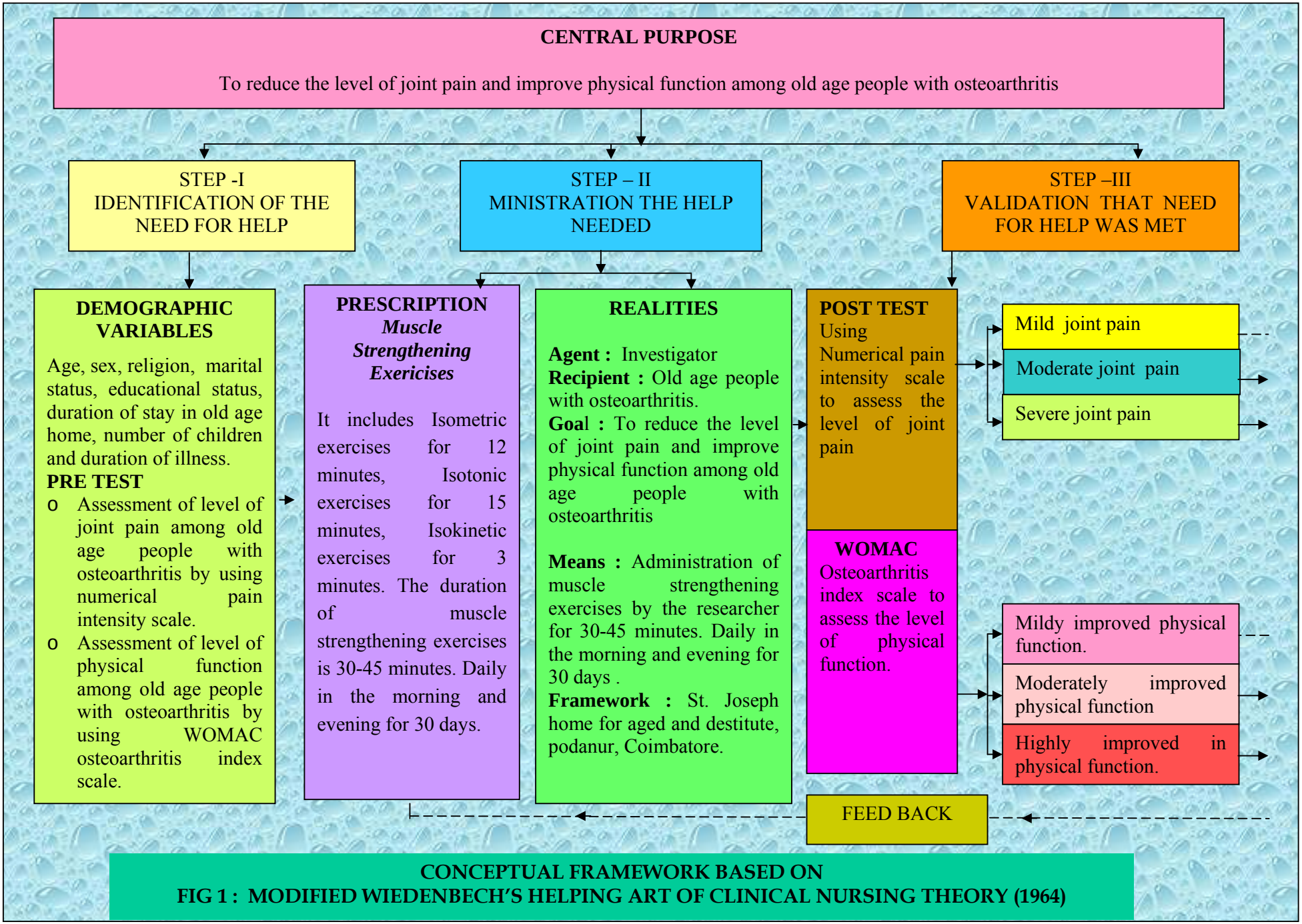
According to the theorist the framework consists of the human, environmental, professional, and organizational facilities that not only make up the context within which nursing is practiced but also constitute its currently existing limits.

In this study, it refers to the St. Joseph home for aged and destitute, podanur, Coimbatore.

Step III- Validation that need for help was met

According to the theorist the third component is Validation. After the help has been ministered the nurse validates that the action were indeed helpful. Evidence must come from the patient that the purpose of the nursing action has fulfilled.

In this study the validating need for help was met by means of post assessment of level of joint pain and physical function by using numerical pain intensity scale and WOMAC Osteoarthritis index scale.



CONCEPTUAL FRAMEWORK BASED ON
FIG 1 : MODIFIED WIEDENBECH'S HELPING ART OF CLINICAL NURSING THEORY (1964)

CHAPTER – II

REVIEW OF LITERATURE

This chapter deals with the related to review of literature. The literatures are grouped under the following headings

PART I:

- Overview of
  - a. Osteoarthritis
  - b. Muscle Strengthening exercises

PART II:

Section A: Studies related to incidence and prevalence of osteoarthritis among old age people with osteoarthritis

Section B: Studies related to osteoarthritis

Section C: Studies related to management of pain among old age people with osteoarthritis

Section D: Studies related to improving physical function among old age people with osteoarthritis

Section E: Studies related to effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis

Section F: Studies related to nurses role in reducing joint pain and improving physical function function among old age people with osteoarthritis

PART I

OVER VIEW OF OSTEOARTHRITIS

INTRODUCTION

Osteoarthritis also known as degenerative joint disease is the most common type of rheumatic disease in the United States. The prevalence of osteoarthritis increases with age, with the majority of people over the age of 65 being affected.

DEFINITION

Osteoarthritis is a slowly progressive non inflammatory disorder of the diarthrodial (synovial) joints.

Lewis et.al.,(2007)

INCIDENCE

Osteoarthritis is no longer considered to be a normal part of the aging process, but growing older continues to be consistently identified as one risk factor for disease development. Cartilage destruction can actually begin between 20 and 30, and the majority of adults are affected by age 40. Few patients experienced symptoms until after age 50 or 60, but more than half of those over 65 years. The incidence of osteoarthritis after age 50 is higher in women.

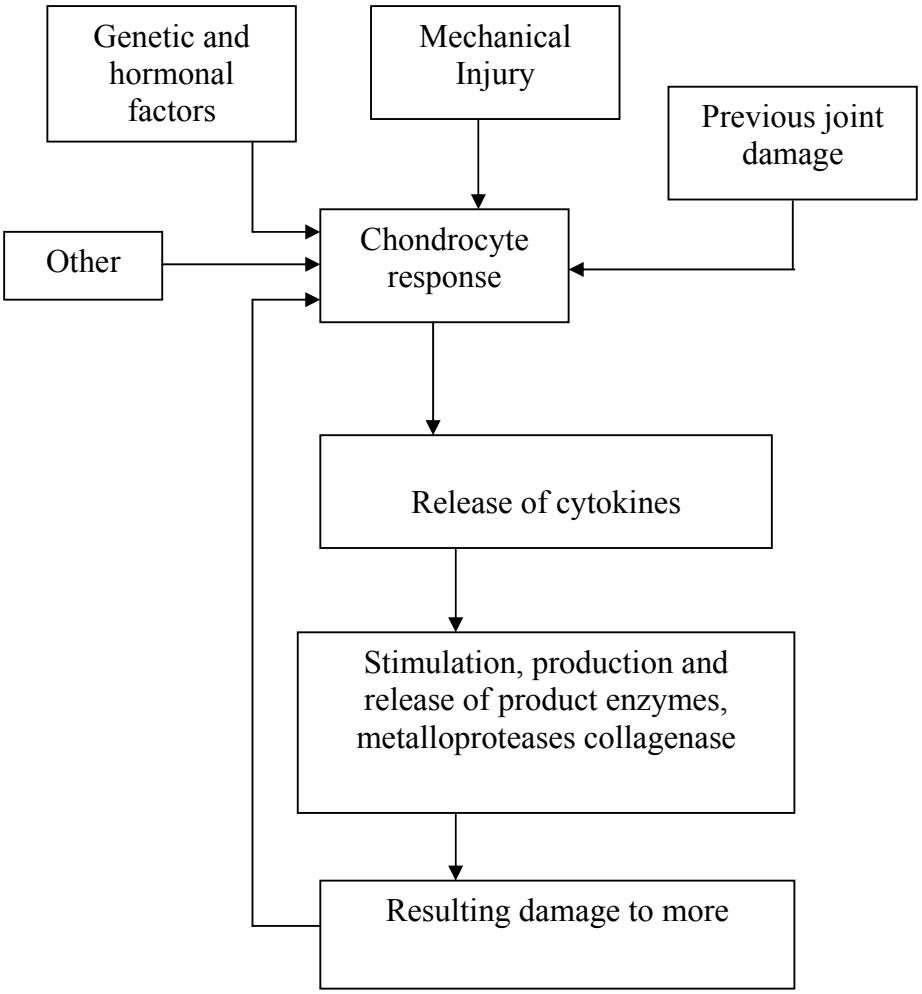
Lewis et.al.,(2007)

CAUSES

Osteoarthritis may occurs as an idiopathic. Primary cause is unknknown. Secondary causes are trauma, mechanical stress, inflammation, joint instability

Lewis et.al.,(2007)

PATHOPHYSIOLOGY



Suddharths B., (2008)

CLINICAL MANIFESTATION

- Worsening pain
- Stiffness that increase with activity and relieved by rest.
- Affected joints may exhibits crepitus
- Mild tenderness in the area of joint area
- Deficits in range of motion (ROM)
- Possibly some joint enlargement
- One or more joints may be affected but joint discomfort is not usually symmetrical.

Black M., (2005)

DIAGNOSTIC FINDINGS

- History collection
- Physical examination
- X – rays
- Bone scan
- CT scan
- Magnetic resonance imaging
- Laboratory test
    - Sensitivity test
    - ESR
    - Erythrocyte
    - Complete blood count

Lewis.et. al.,(2007)

COLLABORATIVE CARE:

Collaborative care focuses on managing pain and inflammation, presenting disability and maintaining and improving joint function.

- ✓ Nutritional and weight management counseling.

Therapeutic exercise

Muscle strengthening exercises to increase or maintain muscle muscle tone and strength.

Drug therapy

- Acetaminophen
- Non steroidal anti inflammatory drugs
- Antibiotics
- Intra auricular corticosteroids
- Opioid analgesics

Lewis.et.al., (2007)

Joint protection and rest

The affected joint should be rested during any periods of acute inflammation and maintained in a functional position with splints. Immobilization should not exceed 1 week because of the risk of joint stiffness with in activity.

Lewis.et.al., (2007)

Heat and cold applications

Applications of heat and cold may help reduce complaints of pain and stiffness heat therapy is especially helpful for stiffeness.

Lewis .et.al., (2007)

Nutritional therapy

If the patient is over weight, a weight education program is a critical part of the total treatment plan.

Lewis.et.al., (2007)

By regulating diet, person can alleviate the symptoms of osteoarthritis. Antioxidant vitamins C and E may provide some protection. Vitamin D and calcium are recommended for strong bones.

Dr. Jameel.,(2011)

Complementary and alternative therapies Acupuncture

- ❖ Use of yoga
- ❖ Massage
- ❖ Guided imagery
- ❖ Therapeutic touch

Black.M., (2005)

Surgical management

- Excision of loose bodies
- menisectomy
- synovectomy

- joint reconstruction or joint debridement
- proximal tibial osteotomy
- total knee arthroplasty
- Tidal irrigation

John Ebenazer.,(2005)

COMPLICATION

- ❖ Deformity
- ❖ Joint malalignment
- ❖ Cartilage loss

Lewis.et.al.,(2007)

Possible complications of osteoarthritis include:

- ➢ Rapid, complete breakdown of cartilage resulting in loose tissue material in the joint (chondrolysis).
- ➢ Bone death (osteonecrosis).
- ➢ Stress fractures (hairline crack in the bone that develops gradually in response to repeated injury or stress).
- ➢ Bleeding inside the joint.
- ➢ Infection in the joint.
- ➢ Deterioration or rupture of the tendons and ligaments around the joint, leading to loss of stability.
- ➢ Pinched nerve (in osteoarthritis of the spine).

Anne C.et.al.,(2009)

OVERVIEW OF MUSCLE STRENGTHENING EXERCISES

DEFINITION OF EXERCISE

Active exertion of muscles involving the contraction and relaxation of muscle groups is termed exercise.

Tylor.et.al.,(2005)

GOAL OF EXERCISE

Exercise reduces joint pain and stiffness, increase flexibility, muscle strength and endurance, and improves the physical well being.

MUSCLE STRENGTHENING EXERCISES:

Muscle strength has been defined as the ability to exert maximum force against resistance.

Hoeger.et .al., (1990)

Muscle strengthening exercises can be classified into three categories

- ✓ Isometric exercise
- ✓ Isotonic exercise
- ✓ Isokinetic exercise

Bandy Sanders(2001)

I.ISOMETRIC EXERCISE:

Isometric exercise involves muscle contraction without shortening. (There is no movement or only a minimum shortening of muscle fibers).

Duration:

The duration used in research on isometric training has varied from 3 to 100 sec. The majority studies reviewed that depart strength gains after isometric training used 6 sec contractions.

Strength training should be done for 30-45 minutes daily in the morning and evening.

Techniques

1) ISOMETRIC ELBOW FLEXION:

Purpose : Strengthening biceps muscle of the elbow in two parts of the range of motion

Duration : 3 minutes

Procedure :

Step 1: Patient sitting with hips and knees flexed to $90^{0.}$

Step2: Place distal hand on client's wrist and proximal hand on client's shoulder.

***Step 3*:** Client flexes arm as clinician provides isometric resistance to the movement with distal hand.

***Step 4*:** Resistance should be held for 6-10 sec per repetition.

2) ***ISOMETRIC SHOULDER ABDUCTION***

Purpose:

Strengthening abductor muscles of the shoulder in the plane of the scapula in two parts of the Range of motion

Duration: 3 minutes

Procedure:

Step 1: Patient sitting with hips and knees flexed at 90^0 clinician place distal hand on clients wrist and proximal hand on clients shoulder Exercise at 100^0 of shoulder abduction

Step 2: The client arm as clinician provides isometric resistance to the movement with distal hand

Step 3: Resistance should be held for 6 to 10 sec per Repetition.

3) KNEE EXTENTION EXERCISE

Purpose: Strengthening quadriceps muscles

Duration: 3 minutes

Procedure:

Step 1: client sitting with both legs flexed to 45^0 . The left leg placed on the anterior surface of the right leg.

Step 2: The client uses leg to flex and provides isometric resistance against anterior surface of right leg.

Step 3: Right leg attempts to extend against resistance of left leg.

Step 4: Resistance should be held for 6 to 10 sec per Repetition.

4) *ISOMETRIC ANKLE DORSIFLEXION EXERCISE*

Purpose: Strengthening tibialis anterior muscle of the ankles

Duration: 3 minutes

Procedure:

Step 1: Patient sitting with hip and knee flexed 90^0.

Step 2: Client places right foot on anterior surface of left foot.

Step 3: The client uses right foot to plantar flex and provide resistance against anterior surface of left foot. Left foot attempts to dorsiflex against resistance of right foot

Step 4: Resistance should be held for 6 to 10 sec per repetition.

Bandy.Sanders., (2001)

Advantages of isometric exercise:

- Workout is much faster
- Isometric exercise reduces joint pain
- Can gain strength, muscle mass and muscle tone
- Increase circulation to the exercise body part.

Disadvantages of Isometric exercise

- Decreased muscular endurance
- Increased Blood pressure
- Building strength during a static contraction can potentially reduce the speed of the muscle response.

II. ISOTONIC EXERCISE:

Isotonic exercise involves muscle shortening and active movement. Examples include independently performing range of motion exercises, walking.

TECHNIQUES:

1) SHOULDER EXTERNAL ROATATION:

Purpose: Strengthening external rotator muscles of the rotator cuff of the shoulder in two different positions of shoulder abduction.

Duration : 3 minutes

Procedure:

Step 1: Client positions shoulder in a conservative position of adduction next to the Body or a more aggressive position of the shoulder of external rotation at 90^0 of abduction.

Step 2: From an internally rotated position, client externally rotates shoulder against resistance , pauses at end range of external rotation.

Step 3: Then, slowly and with control, the client allows the arm to return to the starting position.

2) ***LEG RAISE WITH CUFF WEIGH:***

Purpose: Strengthening hip flexors using straight leg raise.

Duration: 3 minutes

Procedure:

***Step** 1:* Client lying supine with cuff weight strapped around ankle. Opposite leg may be flexed for comfort of client.

Step 2: Client raises leg, holds briefly in flexed position, and slowly lowers leg to starting position.

3) ***HIP ABDUCTION:***

Purpose: Strengthening hip abductor muscles.

Duration: 3 minutes

Procedure:

Step 1: Client lying on side with cuff weight strapped around ankle of leg closes to ceiling. Opposite leg may be flexed for comfort of client.

Step 2: Client raises leg, holds briefly in abducted position, and slowly lowers the leg to starting position.

4) *HIP EXTENSION*:

Purpose: Strengthening hamstring muscles of the knee

Duration: 3 minutes

Procedure:

Step 1: Client lying prone with leg held over edge of plinth.

Step 2: Cuff weight strapped around ankle.

Step3: Client slowly lowers leg to the floor. After a brief pause client lifts leg into hip extension.

5) *KNEE EXTENSION*:

Purpose: Strengthening quadriceps muscles of the knee in a limited or protected Range of motion

Duration: 3 minutes

Procedure:

Step 1: Client lying supine with cuff weight strapped around ankle.

Step 2: A bolster or towel roll is placed under client's knee allowing a limited range of motion.

Step 3: Client extends knee through partial range of motion .Once fully extended client pauses briefly, holding knee in extended position and then slowly lowers leg with control from full extension.

Bandy sanders., (2001)

BENEFITS:

- ❖ increased muscle mass, muscle tone, and strength
- ❖ improved joint mobility
- ❖ increased cardiac and respiratory function
- ❖ increased circulation.

III. ISOKINETIC EXERCISE:

Isokinetic exercise involves muscle contractions with resistance, varying at a constant rate produced by a device with a capacity for variable resistance

QUADRICEPS EXERCISES FOR KNEE AND HIP:

Duration: 3 minutes

Procedure:

Step 1: while in seated position on a chair with legs fully extended, make the thigh muscles tightened trying to push back the knee down towards the floor.

Step 2: Hold for 10 seconds, relax and then repeat.

Bandy sanders.,(2001)

PART II

SECTION A:

STUDIES RELATED TO INCIDENCE AND PREVALENCE OF OSTEOARTHRITIS

Ida K Haugen .et.al., (2011). The study was conducted on Prevalence, incidence and progression of hand osteoarthritis in the general population. The aim of the study to describe the prevalence and longitudinal course of radiographic, erosive and symptomatic hand osteoarthritis (HOA) in the general population. Framingham osteoarthritis (OA) study participants obtained bilateral hand radiographs at baseline and 9-year follow-up. The result was, Mean (SD) baseline age was 58.9 (9.9) years (56.5% women). The age-

standardized prevalence of HOA was only modestly higher in women (44.2%) than men (37.7%), whereas the age-standardized prevalence of erosive and symptomatic OA was much higher in women (9.9% vs. 3.3%, and 15.9% vs. 8.2%).

Salve H.et.al.,(2010) A community-based cross-sectional study was carried out in an urban resettlement colony in South Delhi to study the prevalence of knee osteoarthritis in women aged ≥40 years and treatment seeking behavior of women suffering from osteoarthritis. . A total 260 women were interviewed out of which 123 (47.3%) women were found to be suffering from knee osteoarthritis. Prevalence of osteoarthritis found to be increased with age. Less than half of those with osteoarthritis underwent treatment. With this high prevalence of osteoarthritis, there is need to spread awareness about the disease, its prevention, and rehabilitation in the community.

Jacek A.et.al.,(2007).The study was conducted on Descriptive Epidemiology of Osteoarthritis in British Columbia, Canada. The aim of the study to estimate OA prevalence and incidence rates by age and sex in a geographically defined population of 4 million people. The overall prevalence of OA in 2001 was 10.8%: 8.9% in men and 12.6% in women. Prevalence was higher in women in all age groups. By age 70–74 years, about one-third of men and 40% of women had OA. Incidence rates in 2000-01 were 11.7 per 1000 person-years in the total population, 10.0 in men and 13.4 in women. Rates increased linearly with age between 50 and 80 years.

Pankaj Kumar Manda. et.al.,(2006) The aim of the study to assess the prevalence of chronic diseases and disability and associated factors among geriatric females in a rural area of West Bengal. Cross-sectional study was done. Prevalence of disability was 23.8%. Different socio-demographic and chronic diseases were found associated with disability. On analysis of different chronic diseases it was observed that Acid peptic disorder, hypertension,

ischemic heart disease, osteoporosis, and osteoarthritis were significantly associated with disability. Among the risk factors of disability considered for this study 82.1% could be explained by logistic regression analysis.

Arden N. et.al.,(2005) Osteoarthritis (OA) is the most common joint disorder in the world. In Western populations it is one of the most frequent causes of pain, loss of function and disability in adults. Radiographic evidence of OA occurs in the majority of people by 65 years of age and in about 80% of those aged over 75 years. In the US it is second only to ischemic heart disease as a cause of work disability in men over 50 years of age, and accounts for more hospitalizations than rheumatoid arthritis (RA) each year. Despite this public health impact, OA remains an enigmatic condition to the epidemiologist.

Srikanth VK.et.al., (2005) Regarding sex differences in osteoarthritis (OA) by performing a meta-analysis of sex differences in OA prevalence, incidence and severity in Australia. Random effects meta-analysis selected. Males had a significantly reduced risk for prevalent OA in the knee [Risk Ratio (RR) 0.63, 95% CI 0.53-0.75]. . Males aged <55 years had a greater risk of prevalent cervical spine OA [RR 1.29, 95% CI 1.18-1.41]. Males also had significantly reduced rates of incident OA in the knee. Females, particularly those > or = 55 years, tended to have more severe OA in the knee but not other sites. The results demonstrate the presence of sex differences in OA prevalence and incidence, with females generally at a higher risk. Females also tend to have more severe knee OA, particularly after menopausal age.

Elizabeth A.et.al.,(2005) The aim of the study to estimate the prevalence of mobility disabilities among non institutionalized adults in England and to compare the disabling symptoms reported by middle-aged and older people. Cross-sectional data were selected. 1016 respondents aged 50 years and older living in private households in 2002.The prevalence of difficulty walking a quarter mile increases sharply with age, but even in the middle-aged (50 to 64

years age-group) 18% (95% confidence interval [CI]: 16% to 19%) of men and 19% (95% CI: 17% to 20%) of women reported some degree of difficulty: pain in the leg or the foot (43%; 95% CI: 40% to 46%) . Mobility (walking) disabilities in the middle-aged are relatively common. More clinical attention paid to disabling symptoms may lead to disability reductions in later life.

Bedson J et.al.,(2004). The study was conducted on prevalence and history of knee osteoarthritis in general practice. The aim of the study to determine the prevalence of knee osteoarthritis diagnosed in primary care. A case control study was carried out in one general practice in North Staffordshire. A total of 146 cases and controls were reviewed; 49% of cases and 15% of controls had a previous (pre-1998) diagnosis of knee osteoarthritis. This gives an estimated prevalence of diagnosed knee osteoarthritis in the general population aged ≥45 years of 12.5%.There was no association between an X-ray at first diagnosis and previous knee symptoms (odds ratio 0.98; 95% confidence interval 0.49–1.97)

Lynette M March.et.al.,(2004). Arthritis affects around 3 million people in Australia, representing about 15% of the population. Osteoarthritis is the leading cause of pain and disability among the elderly. On the basis of international radiological survey data, the Australian Institute of Health and Welfare (AIHW) estimated that there are some 27 000 new cases of radiological OA among women each year (peak rate of onset of 13.5 per 1000 population in the 65–74 years age group) and about 15 500 new cases among men (peak rate of 9.0 per 1000 in those aged 75 years and over). More recent radiological longitudinal surveys in the United Kingdom suggest that the incidence may be higher, with 20–30 women per 1000 aged 50 to 60 years developing new radiological knee, hip and spinal OA each year

SECTION B:

STUDIES RELATED TO OSTEOARTHRITIS

Michelle Hui,.et.al.,(2011) The study was conducted on Does smoking protect against osteoarthritis? Meta-analysis of observational studies. To determine whether smoking is protective against the development of osteoarthritis (OA) Results was of 48 studies (537 730 participants) identified from the systematic literature search, 8 were cohort, 21 cross-sectional and 19 case–control. There was an overall negative association between smoking and OA (OR=0.87; 95% CI 0.80 to 0.94) and subgroup analysis confirmed this in case–control studies (OR=0.82; 95% CI 0.70 to 0.95), but not in cohort (OR=0.92; 95% CI 0.81 to 1.06) or cross-sectional studies (OR=0.89; 95% CI 0.78 to 1.01).

Eveline Nuesch.et.al.,(2011) To examine all cause and disease specific mortality in patients with osteoarthritis of the knee or hip in southwest of England. 1163 patients aged 35 years or over with symptoms and radiological confirmation of osteoarthritis of the knee or hip. Excess mortality was observed for all disease specific causes of death but was particularly pronounced for cardiovascular (mortality ratio 1.71, 1.49 to 1.98) Mortality increased with increasing age (P for trend <0.001), male sex (adjusted hazard ratio 1.59, 1.30 to 1.96), self reported history of diabetes (1.95, 1.31 to 2.90), cancer (2.28, 1.50 to 3.47), cardiovascular disease (1.38, 1.12 to 1.71), and walking disability (1.48, 1.17 to 1.86). The more severe the walking disability, the higher was the risk of death (P for trend <0.001).

Stefano Volpato. et.al., (2007) the aim of the study is to examined the association between diabetes and lower extremity function in a sample of disabled older women. Cross-sectional analysis of 1,002 women (aged ≥65 years). Women with diabetes were significantly more likely to have cardiovascular diseases, peripheral nerve dysfunction, visual impairment,

obesity, and depression. After adjustment for age, women with diabetes had a greater prevalence of mobility disability (odds ratio [OR] 1.85, 95% CI 1.12–3.06), activities of daily living disability (1.61, 1.06–2.43), and severe walking limitation (2.34, 1.56–3.50), and their summary mobility performance score (0–12 scale based on balance, gait speed, chair stands) was 1.4 points lower than in nondiabetic women ($P < 0.001$). Even among physically impaired older women, diabetes is associated with a major burden of disability.

Hay Em. et al (2006) The objective of this study to evaluate the effectiveness of two primary care strategies for delivering evidence based care to people aged 55 or over with knee pain: enhanced pharmacy review and community physiotherapy. Pragmatic multicentre randomized clinical trait design. 15 general practices in North Staffordshire. 325 adults aged 55 years or over (mean 68 years) consulting with knee pain; 297 (91%) reached six month intervention. Mean baselinWOMAC pain score was 9.1(SD 3.7) and mean baseline function score was 29.9 (SD-12.8). At three months, the mean reductions in pain scores were 0.41 (SD 2.8) for control, 1.59 (3.2) for pharmacy, and 1.5 (3.4) for physiotherapy reductions in function scores were 0.80 (8.5), 2.61(9.8) and 4.79 (10.8).

Adamson. et.al.,(2006) The study was conducted on Prevalence and risk factors for joint pain among men and women. To examine the association between three modifiable risk factors (obesity, smoking, and alcohol consumption) and reported joint pain. Cross sectional data were collected on 858 people aged 58 years living in the West of Scotland and on the same individuals four years later, aged 62 years. The strongest relation was with knee pain (odds ratio = 2.42 (95% confidence interval, 1.65 to 3.56)). There were no strong consistent associations between smoking habits and pain in any joint after adjusting for sex, alcohol consumption, body mass index, social class, and occupational exposures. Similarly, alcohol was not consistently related to pain

in any joint in the fully adjusted models. Obesity had consistent and readily explained associations with lower limb joint pain.

Holmberg S.et.al.,(2005). The study was conducted on Knee osteoarthritis and body mass index. The aim of this study was to investigate the risk of knee osteoarthritis for men and women in relation to body mass index (BMI) within the normal weight range and to assess the effect of former versus current weight. 825 cases with X-ray verified femorotibial osteoarthritis and 825 age-, sex-, and county-matched population controls. Mean age of the participants was 63 years, and 57% were women. A moderate increase in BMI, within the normal weight range, was significantly related to knee osteoarthritis among men. Overweight at any time was related to knee osteoarthritis.

Jordan et.al.,(2003) A study to assess both conventional and complementary therapy use in these two populations. All patients over 55 yr with a clinical diagnosis of knee OA. A total of 4566 patients over 55 yr were registered in the two practices. Of these, 828 (18.13%) had a clinical diagnosis of knee OA and 240 (29%) patients were asymptomatic at the time of survey. There was a high prevalence of non-steroidal anti-inflammatory drug (NSAID) use, being significantly more in the affluent population ($P < 0.05$). The median amount spent on complementary medicine per month was £5.00, with the affluent population spending significantly more ($P < 0.05$). Complementary medicines and therapies are commonly used, particularly in affluent populations.

Wilder.F.V.et.al.,(2003) To evaluate the association between weather (barometric pressure, precipitation and temperature) and pain among individuals with osteoarthritis (OA) *(*neck, hand, shoulder, knee and foot. Prospective study evaluated men and women, aged 49–90yr. considered significant. . The total number of pain recordings varied by site, ranging from 2269 (feet) to 6061 (hands). The mean temperature was 23°C with a low of 0°C

and a high of 36°C. Precipitation levels ranged from 0.00–21.08cm, with a mean of 0.36cm. Most associations explored produced non significant findings. However, among women with hand OA, higher pain was significantly associated with days of rising barometric pressure (P<0.001). Among a population of exercisers aged 49yr and older, overall these findings did not support the hypothesis that weather is associated with pain.

Dawson j.et.al.,(2003). The study was conducted on an investigation of risk factors for symptomatic osteoarthritis of the knee in women using a life course approach. The aim of this study was to explore risk factors for symptomatic knee osteoarthritis (OAK) in women, which included wearing high heeled shoes. The design was matched case-control study. Interviews in participants homes. Women aged 50 to 70 years are the samples. . Virtually all measures of high heeled shoes use were associated with reduced risk of OAK, although none of these findings were statistically significant. In multivariate analysis only BMI 25 or above at age 36–40 remained significantly associated with OAK (OR 36.4, 95% CI 3.07 to 432, p=0.004), although weak evidence suggested certain occupational activities might increase risk.

Lewis.M.et.al.,(2000) To design and test the performance of a new knee pain screening tool (KNEST), both separately and together with a combination of existing questionnaires, which will be used to assess the general health status of knee pain sufferers in primary care. A postal survey of knee . Pain and disability was sent to a random sample of 240 individuals aged over 55yr registered with two general practices in North Staffordshire. The 12month prevalence of knee pain identified from baseline responders to the survey was 45%. The new knee pain question achieved 94% completion. All items on the SF-36, HADS and WOMAC were well completed, with ranges as follows: SF-36, 87.4–98%; HADS, 98–99%; WOMAC, 88–100%.

Peat G. et.al., (2000) Osteoarthritis is the single most common cause of disability in older adults. To discuss case definition of knee osteoarthritis for primary care and to summarize the burden of the condition in the community and related use of primary health care in the United Kingdom. Narrative review. During a one year period 25% of people over 55 years have a persistent episode of knee pain, of whom about one in six in the UK and the Netherlands consult their general practitioner about it in the same time period. The prevalence of painful disabling knee osteoarthritis in people over 55 years is 10%, of whom one quarter is severely disabled. Healthcare provision in primary care needs to focus on this broader group to impact on community levels of pain and disability.

SECTION C:

STUDIES RELATED TO MANAGEMENT OF JOINT PAIN AMONG OLD AGE PEOPLE WITH OSTEOARTHRITIS

Judith M.et.al.,(2010) This quasi experimental two-group pilot study tested an intervention aimed at educating older adults in rural communities about the appropriate use of non drug treatments for pain. Individuals aged ≥60 years who experienced pain in the preceding 2 weeks were recruited from rural Midwestern communities All participants (n = 53) completed a series of questionnaires (Brief Pain Inventory, Symptom Distress Scale, Perceived Control Scale) at the initial educational session (T1) and at a two-week follow-up session (T2) Hot and cold packs and relaxation breathing instruction were provided for use over the 2-week period. There was a significant increase in the use of all non drug treatments and a decrease in pain-related distress and current pain scores in the experimental group compared with the control group.

Alan D.et.al.,(2010) The present review on pain management in the elderly focuses on relevant information for the pain clinician. Elderly patients present with increased fat mass, decreased muscle mass, and decreased body water, all of which have important ramifications on drug distribution. There is a

predictable age-related decline in cytochrome P-450 functions and, combined with the polypharmacy that much of the elderly population experiences, this may lead to a toxic reaction of medications. One of the newer opiates, oxymorphone, has recently been studied as it is metabolized in a non-cytochrome P-450 pathway and therefore bypasses many of the drug-drug interactions common to the elderly.

Nuesch E.et.al., (2009) the study was conducted on oral or transdermal opioids for osteoarthritis of the knee or hip. The aim of the study was to determine the effects on pain and function and the safety of oral or transdermal opioids as compared with placebo or no intervention in patients with osteoarthritis of the hip or knee. Randomised or quasi-randomized controlled trials. Ten trials with 2268 participants were included. Oral codeine was studied in three trials, transdermal fentanyl and oral morphine in one trial each, oral oxycodone in four, and oral oxymorphone in two trials. Overall, opioids were more effective than control interventions in terms of pain relief (SMD -0.36, 95% CI -0.47 to -0.26) and improvement of function (SMD -0.33, 95% CI -0.45 to -0.21).

Yin Bing Yip. et.al.(2008) a study to assess the efficacy of an aromatic essential oil (1% Zingier officinale and 0.5% Citrus sinesis) massage among the elderly with moderate-to-severe knee pain. 59 older persons were enrolled in a double-blind, placebo-controlled experimental study group from the Community Centre for Senior Citizens, Hong Kong. There were significant mean changes between the three time-points within the intervention group on three of the outcome measures: knee pain intensity ($p = 0.02$); stiffness level ($p = 0.03$); and enhancing physical function ($p = 0.04$) The improvement of physical function and pain were superior in the intervention group compared with both the placebo and the control group at post 1-week time (both $p = 0.03$) but not sustained at post 4 weeks ($p = 0.45$ and 0.29).

Tseng CN. et al (2007) A study was conducted on effects of a range of motion exercise programme. The aim of this paper reports an evaluation of a range of motion exercise programme aimed at improving joint flexibility activity function, perception of pain. A randomized controlled trial was conducted in 1999 with 59 bedridden older stroke survivors in residential care. Both intervention groups had statistically significant improvement in joint angles, activity function perception of pain and depressive symptoms compared with the usual care group ($p<0.05$). A simple nurse led range of motion exercise programme can generate positive effects in enhancing physical and psychological function.

Majid Artus.et.al.,(2006) the aim of the study was to determine CAM use among patients with chronic musculoskeletal pain who have consulted about their pain in primary care. Face-to-face interview-based survey. 138 interviews were completed. 116 participants (84%) had used at least one CAM treatment for pain in the previous year. 65% were current users of CAM. The ratio of over-the-counter CAM use to care from a CAM provider was 3:2. 111 participants (80%) had used conventional treatment. 95 (69%) were using a combination of CAM and conventional treatment. Glucosamine and fish oil were the most commonly used CAM treatments (38%, 35% respectively). The observation that most users of conventional medicine also used CAM suggests a continuing need for more investigation of effective pain management in primary care.

SECTION D:

STUDIES RELATED TO IMPROVING PHYSICAL FUNCTION AMONG OLD AGE PEOPLE WITH OSTEOARTHRITIS

Dennis T. et.al.,(2011) Obesity exacerbates the age-related decline in physical function and causes frailty in older adults. 1 year randomized, controlled trial, we evaluated the independent and combined effects of weight loss and exercise in 107 adults who were 65 years of age or older and obese. A total of 93

participants (87%) completed the study. Body weight decreased by 10% in the diet group and by 9% in the diet–exercise group, but did not decrease in the exercise group or the control group (P<0.001). These findings suggest that a combination of weight loss and exercise provides greater improvement in physical function than either intervention alone.

Rydevik K.et.al.,(2011) Functioning and disability in patients with hip osteoarthritis with mild to moderate pain. Cross-sectional study. Twenty-six patients (12 men, 14 women; mean age, 60 years) with radiographic and symptomatic hip OA were matched to 26 controls without hip pain. The patients with hip OA had mild to moderate pain, as indicated by the Western Ontario and McMaster University Osteoarthritis Index, and significantly lower knee extension strength (mean difference [95% confidence interval {CI}]: -19.5 [-34.3, -4.7] Nm). Physical therapists should consider including quadriceps-strengthening and hip range-of-motion exercises when developing rehabilitation programs for patients with hip OA, with mild to moderate pain, aiming to improve functioning and reduce disability.

Wang-Saegusa A. et.al.,(2010) the study was conducted on alternative and co-adjuvant therapies to improve the quality of life and physical function of affected patients. A total of 808 patients with knee pathology were treated with PRGF (plasma rich in growth factors), 312 of them with OA of the knee. Statistically significant differences ($P < 0.0001$) between pre-treatment and follow-up values were found for pain, stiffness and functional capacity in the WOMAC Index; pain and total score, distance and daily life activities in the Lequesne Index; the VAS pain score; and the SF-36 physical health domain. At 6 months following intra-articular infiltration of PRGF in patients with OA of the knee, improvements in function and quality of life were documented by OA-specific and general clinical assessment instruments.

Pua YH. Et.al.,(2010) cross-sectional associations of isometric strength and steadiness of the knee extensors and their interaction with physical performance measures of physical function. Sixty-seven adults (27 men and 40 women; age, 61+/-10 y) with radiographically confirmed symptomatic hip osteoarthritis. In the hierarchical regression models, although there were clear main effects of knee extensor steadiness on fast-paced stair performance, greater knee steadiness predictively associated with faster stair-climbing performance particularly in individuals with high knee extensor strength.

Andrew D Beswick.et.al.,(2008) review to assess the effectiveness of community-based complex interventions in preservation of physical function and independence in elderly people. Randomised controlled trials assessing community-based multi factorial interventions in elderly people. We identified 89 trials including 97 984 people. Interventions reduced the risk of not living at home (relative risk [RR] 0·95, 95% CI 0·93-0·97). Interventions reduced nursing-home admissions (0·87, 0·83-0·90), but not death (1·00, 0·97-1·02). Risk of hospital admissions (0·94, 0·91-0·97) and falls (0·90, 0·86-0·95) were reduced, and physical function (standardized mean difference -0·08, -0·11 to −0·06) was better in the intervention groups than in other groups.

Gail D.et.al.,(2004) A study to evaluate the effectiveness of physical therapy for osteoarthritis of the knee, applied by experienced physical therapists with formal training in manual therapy. Randomized, controlled clinical trial. 83 patients with osteoarthritis of the knee who were randomly assigned. Clinically and statistically significant improvements in 6-minute walk distance and WOMAC score at 4 weeks and 8 weeks were seen in the treatment group but not the placebo group. By 8 weeks, average 6-minute walk distances had improved by 13.1% and WOMAC scores had improved by 55.8% over baseline values in the treatment group ($P < 0.05$). A combination of manual physical therapy and supervised exercise yields functional benefits for patients with osteoarthritis of the knee

Gary D.et.al.,(2006) Physical function and body composition in older obese adults with knee osteoarthritis (OA) were examined after intensive weight loss. Older obese adults (n = 87; ≥60 years; BMI ≥30.0 kg/m^2) with symptomatic knee OA and difficulty with daily activities were recruited for a 6-month trial. Body weight decreased 8.7 ±0.8% in WL and 0.0 ±0.7% in weight stable (WS). Body fat and fat-free mass were lower for WL than WS at 6 months. WL had better function than WS, with lower Western Ontario and McMaster University Osteoarthritis Index scores, greater 6-minute walk distance, and faster stair climb time ($p < 0.05$). An intensive weight loss intervention incorporating energy deficit diet and exercise training improves physical function in older obese adults with knee OA.

Brenda W.et.al.,(2001) The prevention of disability in activities of daily living (ADL) may prolong older persons. A 2-center, randomized, single-blind, controlled trial was conducted in which participants were assigned to an aerobic exercise program, a resistance exercise program, or an attention control group. Of the 439 community-dwelling persons aged 60 years or older with knee osteoarthritis originally recruited. Exercise was 0.57 (95% confidence interval, 0.38-0.85; P = .006). For resistance exercise and 0.53 (95% confidence interval, 0.33-0.85; P = .009) for aerobic exercise. Aerobic and resistance exercise may reduce the incidence of ADL disability in older persons with knee osteoarthritis. Exercise may be an effective strategy for preventing ADL disability.

SECTION E

STUDIES RELATED TO EFFECTIVENESS OF MUSCLE STRENGTHENING EXERCISES ON JOINT PAIN AND PHYSICAL FUNCTION AMONG OLD AGE PEOPLE WITH OSTEOARTHRITIS

Jennifer E.et.al.,(2009) the study was conducted on Community-Based Strength Training Improves Physical Function in Older Women With

osteoarthritis**.** A multisite, pilot randomized controlled trial to examine the effects of community-based strength training versus usual activity in women (n = 33) 55 years of age and older with arthritis. Lower body strength improved from baseline to 12 weeks in the strength training versus control group (32.2%-7.3%, respectively; *P* = .004). Physical function improved in the strength training group over 12 weeks (range, 7%-50%; *P* < .05), with no change in control group. Adherence to the intervention was 82% ± 16%.These results demonstrate the efficacy of this program and its potential to be disseminated as an evidence-based strength training intervention to improve physical function and strength among older women with osteoarthritis

Liu CJ et.al., (2009) A study was conducted on progressing resistance strength training (PRT) for improving physical function in older adult. The objective of this study is to assess the effects of PRT on older people. Randomized controlled trials reporting physical outcomes of PRT for older people were included 121 trials with 6700 participants were included. PRT resulted in a small but significant improvement in physical ability (33 trials, 2172 participants; SMD 0.14, 95% CI 0.05 to 0.22). Functional limitation reassurances also showed improvements PRT had a large positive effect on muscle strength (73 trails, 3059 participants, SMD 0.84, 95% (I 0.67 to 1.00). Participants with osteoarthritis reported a reduction in pain following PRT (6 trials, 503 participants, SMD – 0.30, 95% (I – 0.48 to – 0.13). PRT is an effective intervention for improving physical functioning in older people, including improving strength and the performance of some simple and complex activities. PRT is an effective intervention for improving physical functioning in older people, including improving strength and the performance of some simple and complex activities.

Jenkinson cm. et al (2009) A study was conducted on effects of dietary intervention and quadriceps strengthening exercises on pain and function in overweight people with knee pain. The objective of this study was to determine

whether dietary intervention or knee strengthening exercise or both, can reduce knee pain and improve knee function. Pragmatic factional randomised controlled trail. 389 men and women aged 45 and over with a body mass index of 7 or = 28.0 and self reported knee pain participants were randomised to dietary intervention plus quadriceps strengthening exercises along. In those randomised to knee exercise improvement in function was evident at 24 months (mean difference-3.64-6.01 to -1.27). A home based, self managed programmed of simple knee strengthening exercises over a two year period can significantly reduce knee pain and improve knee function in over weight and obese people with knee pain.

Oida Y. et al (2008) The objective of this study was to evaluate the effectiveness of an exercise program conducted as part of community health services to improve pain and physical function in elderly people with Osteoarthritis of the knee. They were allocated randomly to the intervention group (h=44) and the control group (n=44) the exercise program classes of 90 min duration were held 8 times over 3 months. The effect of the intervention was 0.44 for WOMAC score, 0.23 for peak torque during knee extension 0.64 for knee flexion, 0.32 for Rom, 0.81 for standing ability and extension, 0.64 for knee flexion 1.13 for waking ability. These results suggested that the exercise program for elderly people with knee OA improved knee pain and physical function.

Hay Em. et al (2006) The objective of this study to evaluate the effectiveness of two primary care strategies for delivering evidence based care to people aged 55 or over with knee pain: enhanced pharmacy review and community physiotherapy pragmatic multicentre randomized clinical trait design. 15 general practices in North Staffordshire. 325 adults aged 55 years or over (mean 68 years) consulting with knee pain; 297 (91%) reached six month intervention. Mean baseline WOMAC pain score was 9.1(SD 3.7) and mean baseline function score was 29.9 (SD-12.8). At three months, the mean

reductions in pain scores were 0.41 (SD 2.8) for control, 1.59 (3.2) for pharmacy, and 1.5 (3.4) for physiotherapy reductions in function scores were 0.80 (8.5), 2.61(9.8) and 4.79 (10.8).

Roddy E.et.al.,(2004) A study conducted on to compare the efficacy of aerobic walking and home based quadriceps strengthening exercises in patients with knee osteoarthritis. Randomised controlled trials were selected. 35 RCTs were identified, 13 of which met inclusion criteria and provided data suitable for further analysis. Pooled effect sizes for pain were 0.52 for aerobic walking and 0.39 for quadriceps strengthening. For self reported disability, pooled effect sizes were 0.46 for aerobic walking and 0.32 for quadriceps strengthening. Both aerobic walking and home based quadriceps strengthening exercise reduce pain and disability from knee osteoarthritis

Brian T.et.al.,(2004) the aim of the study to evaluate the effects of isokinetic exercise versus a program of patient education on pain and function in older persons with knee osteoarthritis. A randomized, comparative clinical trial, with interventions lasting 8 weeks and evaluations of 12 weeks. One hundred thirteen men and women between 50 and 80 years old with diagnosed osteoarthritis of the knee; 98 completed the entire assigned treatment. Both treatment groups showed significant strength gains ($p < .05$), which occurred over a wider velocity spectrum for the exercise group. Isokinetic exercise is an effective and well-tolerated treatment for knee osteoarthritis

Cakin N. et al (2003) The objective of this study is to investigate the relations between cross sectional area and concentric and eccentric torques in the quadriceps and hamstring muscles and to determine how functional capacity relates to pain, muscle mass. Randomized, descriptive study 18 women with bilateral knee OA graded radiographycally. Pain during functional tests was subjectively measured on an 11- point scale (range 0-10). Eccentric torque was significantly (p range, <.05 to .001) greater than concentric torque for the

quadriceps (range 16-100%) and hamstring (range 50%-158%) muscle at all angular velocities. Very small to moderate correlatives (.01-.75) were observed among torque at any velocity and pain.

Miyaguchi M.et.al.,(2002) The purpose of this study was to analyze the biochemical changes in the joint fluid, and pain relief resulting from isometric quadriceps exercise in patients with osteoarthritis of the knee. Nineteen osteoarthritic knees in 17 patients with joint effusion were included. The patients performed isometric quadriceps exercise for 3 months. Pain score decreased from 3.9 to 2.3 after 12 weeks of exercise ($P<0.001$). Isometric quadriceps exercise resulted in significant changes in joint fluid biochemical parameters, and these changes, at least in part, may explain the ameliorative effect of muscle exercise for osteoarthritis of the knee.

Thomas KS.et.al.,(2002) A study was conducted on home based exercise program for knee pain and knee osteoarthritis. Pragmatic, factorial randomized controlled trial of 2 years duration. 786 men and women aged > 45 years with self reported knee pain. WOMAC Osteoarthritis index, SF-36 questionnaire and hospital anxiety and depression scale was used. The result of this study was 600(76.3%) participants completed the study. At 24 months highly significant reductions in knee pain were apparent for the pooled exercise groups compared with the non exercise groups (mean difference -0.82, 95% confidence interval-13 to 0.3) similar improvements were observed at 0.12 and 18 month. The reduction in pain was greater the closed patients adhered to the exercise plan. A simple home based exercise programme can significantly reduce knee pain.

SECTION F:

STUDIES RELATED TO NURSES ROLE IN REDUCING JOINT PAIN AND IMPROVING PHYSICAL FUNCTION AMONG OLD AGE PEOPLE WITH OSTEOARTHRITIS

Tseng CN. et al (2007) A study was conducted on effects of a range of motion exercise programme. The aim of this paper reports an evaluation of a range of motion exercise programme aimed at improving joint flexibility activity function, perception of pain. A randomized controlled trial was conducted in 1999 with 59 bedridden older survivors in residential care. Both intervention groups had statistically significant improvement in joint angles, activity function perception of pain and depressive symptoms compared with the usual care group ($p<0.05$). A simple nurse led range of motion exercise programme can generate positive effects in enhancing physical and psychological function.

CHAPTER - III

METHODOLOGY

This chapter deals with the research approach, research design, setting of the study, population, sample, criteria for sample selection, Sampling and sampling procedure, instrument and scoring procedure, method of data collection and plan for data collection.

RESEARCH APPROACH:

An evaluative approach was used for this study

RESEARCH DESIGN:

The research design was pre experimental one group pre test post test design.

GROUP	PRE TEST	INTERVENTION	POST TEST
Group I	O1	X	O2

O1 – Collection of demographic data, pretest to assess the level of joint pain and physical function among old age people with osteoarthritis

X – Muscle strengthening exercises was given for 30-45 minutes daily in the morning and evening for 30 days

O2 – Post test to assess the level of joint pain and physical function among old age people with osteoarthritis

SETTING OF THE STUDY:

The study was conducted at St.Joseph home for aged and Destitute, Coimbatore.125 old age people residing in the home. They were 75 females and 50 males residing in the home. Old age home has separate block for both male and female. It has all the facilities like dining hall, kitchen, garden and kitchen gardening, chapel and common hall. The common hall can accommodate 150 members at a time.

POPULATION:

The study population comprises of old age people .

SAMPLE:

Old age people with osteoarthritis of the knee who are residing at St.Joseph home for aged and destitute at, podanur, Coimbatore.

CRITERIA FOR SELECTION OF SAMPLE:

Inclusion criteria:

- Old age people between 60 – 75 years
- Both male and female
- Old age people with osteoarthritis of the knee.

Exclusion criteria:

- Old age people with chronic illness such as cardiac and respiratory problems
- Old age people who is confined to bed
- Old age people who are physically challenged
- Old age people who are not willing to participate.

SAMPLE AND SAMPLING PROCEDURE

Sample size:

A sample consist of 50

Sampling technique:

Non probability purposive sampling technique was used to select the samples

INSTRUMENT AND SCORING PROCEDURE:

DESCRIPTION OF TOOL:

Part I:

It consists of demographic variables such as age, sex, religion, marital status, educational status, duration of stay in old age home, number of children, and duration of the illness

Part II:

Numerical pain intensity scale was used to assess the level of joint pain among old age people with osteoarthritis. It consists 10 points in a horizontal line.

Part III:

Modified WOMAC Osteoarthritis index scale was used which was adopted from Nicholas Bellamy (1994) was used to assess the level of physical function among old age people with osteoarthritis. It consists of 20 activity statement.

SCORE INTERPRETATION:

Part I: Numerical pain intensity scale

The option to verbally rate the scale from 0-10. 0-3 indicates mild pain, 4-6 indicates moderate pain, and 7-10 indicates severe pain. Total score is 10

Score interpretation as follows:

S.NO	LEVEL OF JOINT PAIN	SCORE	PERCENTAGE
1	Mild pain	0 -3	0 - 33
2	Moderate pain	4 – 6	34 – 66
3	Severe pain	7 – 10	67 – 100

Part II:

Modified WOMAC Osteoarthritis index scale

The score interpretation is as follows:-

Total score is 80. It is rated as below

- Not able to perform - 1,
- With assistance - 2,
- Independently with difficulty - 3,
- Independently without difficulty -4.

S.NO	PHYSICAL FUNCTION	SCORE	PERCENTAGE
1	Mildly improved physical function	1 – 27	1 – 33
2	Moderately improved physical function	28 – 54	34 – 66
3	Highly improved physical function	55 – 80	67 – 100

VALIDITY AND RELIABILITY OF THE TOOL:

VALIDITY OF THE TOOL:

The content of the tool was established in consultation with guide and 5 experts in the field of medical surgical nursing, orthopaedic surgeon and statistician. The tool was modified according to the suggestion and recommendation of experts

RELIABILITY OF THE TOOL:

Reliability of the Modified WOMAC Osteoarthritis index scale was established by using internal consistency using and Cronbach's alpha Co-efficient formula was used and found to be reliable (r=0.81).The equivalence was assessed by inter rater reliability using Karl Pearson correlation co-efficient formula and found to be reliable (r=0.98)

PILOT STUDY:

The pilot study was conducted in St.Joseph old age home at Dharapuram, for a period of 15 days. A written permission was obtained from the director of old age home. Sample size 6. Oral permission was obtained from the samples. Based on inclusion criteria sample was selected by purposive sampling method. Day 1 sample was diagnosed with physician and same day pre test was done by using numerical pain intensity scale to assess the joint pain and WOMAC osteoarthritis scale to assess the physical function among old age people with osteoarthritis. Muscle strengthening exercises were practiced 30-45 minutes

daily morning and evening for 15 days. On the 15th day post test was done by using the same scale.

Data were analyzed and findings of the pilot study showed that the post test mean score of joint pain 4.33 (SD± 1.36) was lower than the mean pre test score 7.3 (SD± 1.96).The post test mean score of physical function 37.3(SD±3.558) was higher than the pre test score 26.8(SD± 1.8330). The paired't' value for joint pain was 6.726 which was significant at $P<0.05$. The paired't' value for physical function was 8.936 which was significant at $P<0.05$. This shows that the study is feasible and practicable to conduct main study.

DATA COLLECTION PROCEDURE:

The study was conducted in St. Joseph home for aged and Destitute at Coimbatore. Written permission was obtained from the director of old age home. The period of study was 5 weeks. Based on the inclusion criteria, samples were selected by using purposive sampling method. 50 samples were selected. The purpose of the study was explained to the subjects prior to the study. Oral consent was obtained from the samples. Day 1, sample was diagnosed by physician. Day 1 and Day 2 pre test was done for 50 samples.25 samples in each day. The researcher was spending 5-10 minutes for each sample to conduct the pretest. After collecting the demographic variables, numerical pain intensity scale was used to assess the joint pain and WOMAC osteoarthritis scale was used to assess the physical function among old age people with osteoarthritis. The samples were divided into 3 groups with 17 members in group1 and 2, and 16 Members in group 3. The researcher demonstrated and assisted in doing the muscle strengthening exercises for all 3 groups separately. It was continued for 30 days daily morning and evening .Morning session was between 10.00 am to 12.00pm and in evening session was between 3.30 pm- 5.30 pm. Post test was conducted for 2 days, 25 members in each day. Level of joint pain and physical function were assessed by using same scale. The calculated data were analyzed and tabulated

PLAN FOR DATA ANALYSIS:

S. No	Data Analysis	Method	Purpose
1.	Descriptive statistics	Frequency percentage Mean, standard deviation	To assess the demographic variables among old age people with osteoarthritis To assess the pretest and post test level of joint pain among old age people with osteoarthritis To assess the pretest and post test level of physical function among old age people with osteoarthritis
2.	Inferential statistics	Paired 't' test	To compare the pre and post test level of joint pain among old age people with osteoarthritis To compare the pre and post test level of physical function among old age people with osteoarthritis
		'Chi' square test	To find out the association between the post test level of joint pain among old age people with osteoarthritis and their selected demographic variables To find out the association between the post test level of physical function among old age people with osteoarthritis and their selected demographic variables

PROTECTING THE HUMAN SUBJECTS:

The research proposal was approved by dissertation committee prior to conduct of main study .Written permission was obtained from Director of St. Joseph home for aged and destitute at Coimbatore. Before the study verbal consent was obtained from each subject.

CHAPTER IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of the data collection to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St.Joseph Home for aged and destitute, at Coimbatore.

ORGANIZATION OF DATA:

The data had been tabulated and organized as follows

SECTION A : Distribution of demographic variables

SECTION B : Assess the pre test and post test level of joint pain among old age people with osteoarthritis

SECTION C : Assess the pre test and post test level of physical function among old age people with osteoarthritis

SECTION D : To compare the pre and post test level of joint pain among old age people with osteoarthritis

SECTION E : To compare the pre and post test level of physical function among old age people with osteoarthritis

SECTION F : Association between the post test level of joint pain among old age people with osteoarthritis and their selected demographic variables

SECTION G : Association between the post test level of physical function among old age people with osteoarthritis and their selected demographic variables

SECTION A: Distribution of demographic variables among old age people with osteoarthritis

TABLE 1: Frequency and percentage distribution of demographic variables among old age people with osteoarthritis

n=50

S.NO	DEMOGRAPHIC VARIABLES	FREQUENCY	PERCENTAGE %
1.	**Age in years**		
1.1	60-64 years	8	16
1.2	65-68 years	12	24
1.3	69-72 years	15	30
1.4	73- 75 years	15	30
2.	**Sex**		
2.1	Male	19	38
2.2	Female	3 1	62
3.	**Religion**		
3.1	Hindu	32	64
3.2	Muslim	-	-
3.3	Christian	18	36
3.4	Others	-	-
4.	**Marital status**		
4.1	Single	5	10
4.2	Married	15	30
4.3	Widowed	28	56
4.4	Divorced	2	4

5.	**Educational status**		
5.1	No formal education	11	22
5.2	Primary school	25	50
5.3	High school	10	20
5.4	Higher secondary	3	6
5.5	Graduate	1	2
6.	**Duration of stay in old age home**		
6.1	1-5 years	37	74
6.2	6-10 years	11	22
6.3	11-15 years	2	4
6.4	15 years and above	-	-
7.	**Number of children**		
7.1	No children	15	30
7.2	1 child	12	24
7.3	2 children	13	26
7.4	2 children and above	10	20
8.	**Duration of illness**		
8.1	1-2 Years	14	28
8.2	3-4 years	24	48
8.3	5-6 years	11	22
8.4	7-8 years	1	2

Table: 1 shows that the distribution of demographic variables among old age people with osteoarthritis.

Regarding age, majority of old age people with osteoarthritis 15(30%) were in the age group of 69- 72 years and 73- 75 years. 12(24%) were in the age group of 65 -68 years and 8(16%) were in the age group of 64 – 68 years. (Fig.2)

With regard to sex, majority of 31 (62%) were female and 19 (38%) were male.(Fig.3)

Regarding to religion, majority 32 (64%) were Hindu and 18 (36%) were Christian (Fig.4)

Regarding marital status, majority 28 (56%) were widowed, 15 (30%) were married, 5(10%) were single and 2(4%) were divorced. (Fig.5)

Regarding educational status, majority 25(50%) had primary education, 11 (22%) had no formal education, 10 (20%) had high school education, 3(6%) had higher secondary education and 1(2%) were graduates. (Fig.6)

Regarding duration of stay in old age home, majority 37(74%) were staying for 1-5 years, 11(22%) were staying for 6-10 years and 2(4%) were staying 11 -15 years . (Fig.7)

Regarding number of children, majority 15(30%) had no children, 13(26%) had 2 children's, 12 (24%) had 1 child and 10 (20%) had 2 children and above. (Fig.8)

Regarding duration of illness, majority 24(48%) of them were suffering for 3-4 years, 14(28%) of them were suffering for 1-2 years, 11(22%) of them were suffering for 5-6 years, 1(2%) and person was suffering for 7-8 years. (Fig.9)

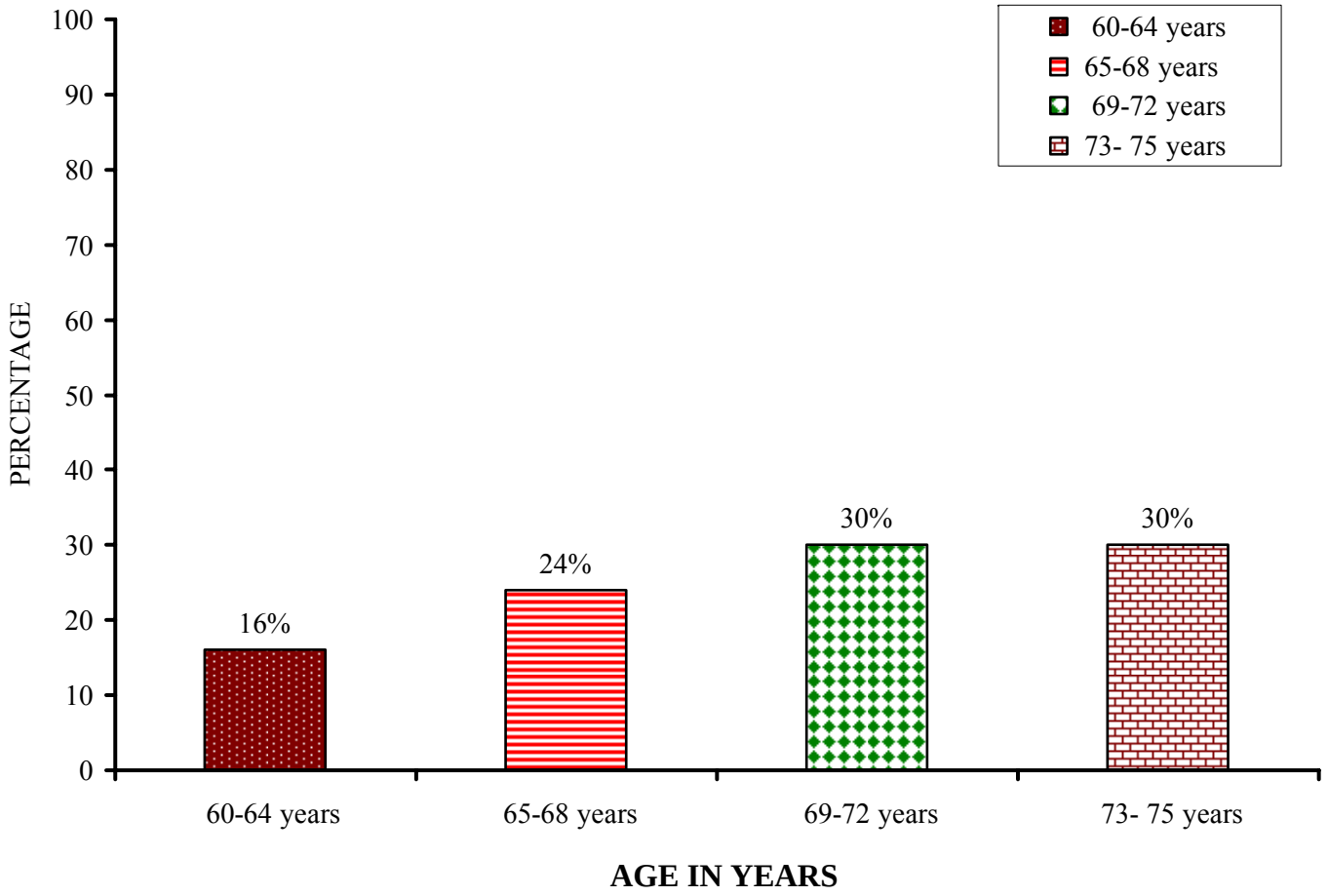
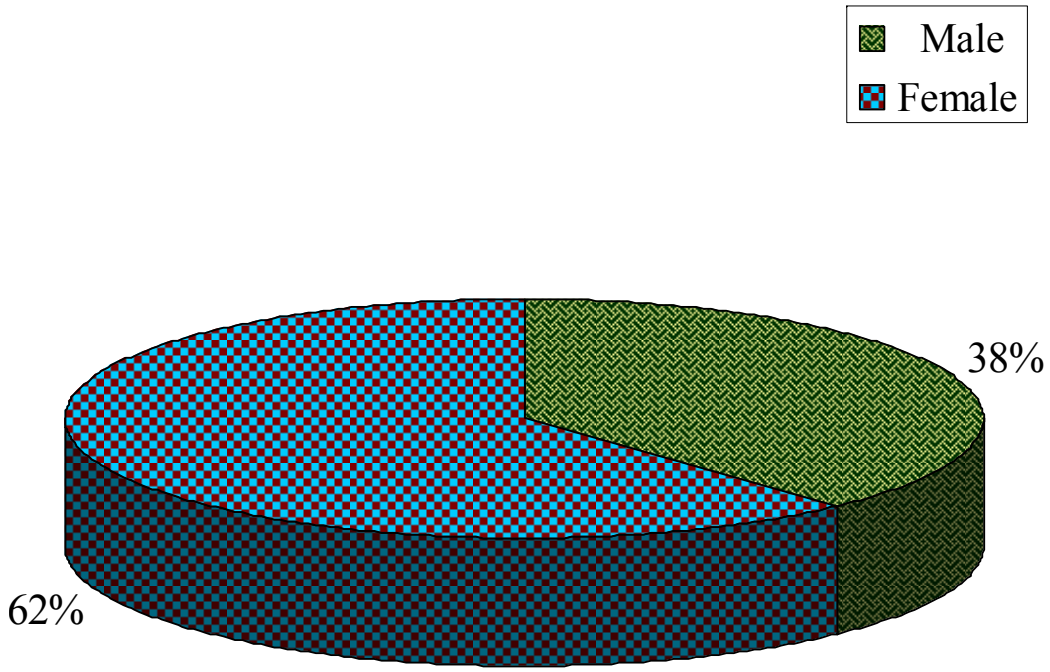
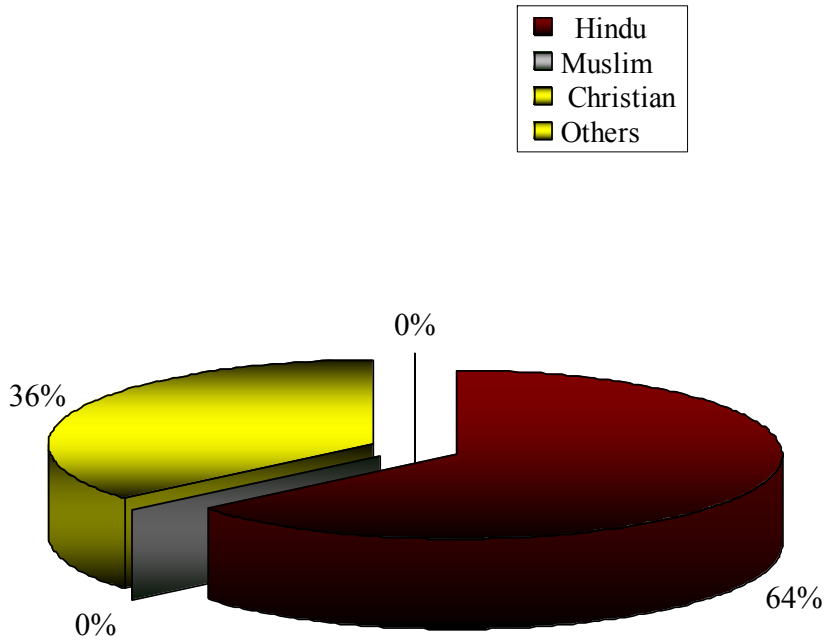


Fig 2:- Percentage distribution of old age people with osteoarthritis according to their age.



SEX

Fig 3:- Percentage distribution of old age people with osteoarthritis according to their sex.



RELIGION

Fig 4:- Percentage distribution of old age people with osteoartritis according to their religion .

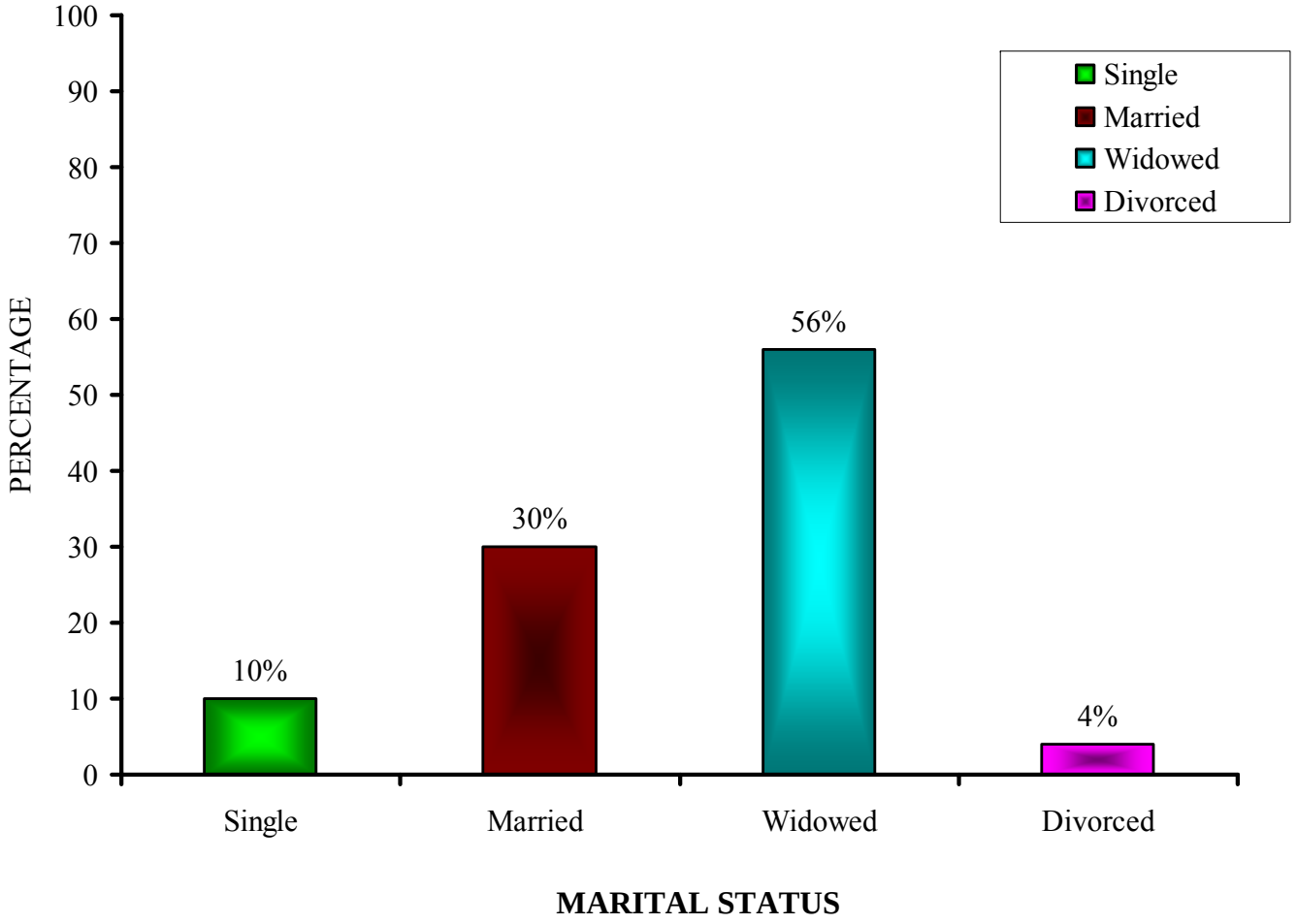


Fig 5:- Percentage distribution of old age people with osteoarthritis according to their marital status

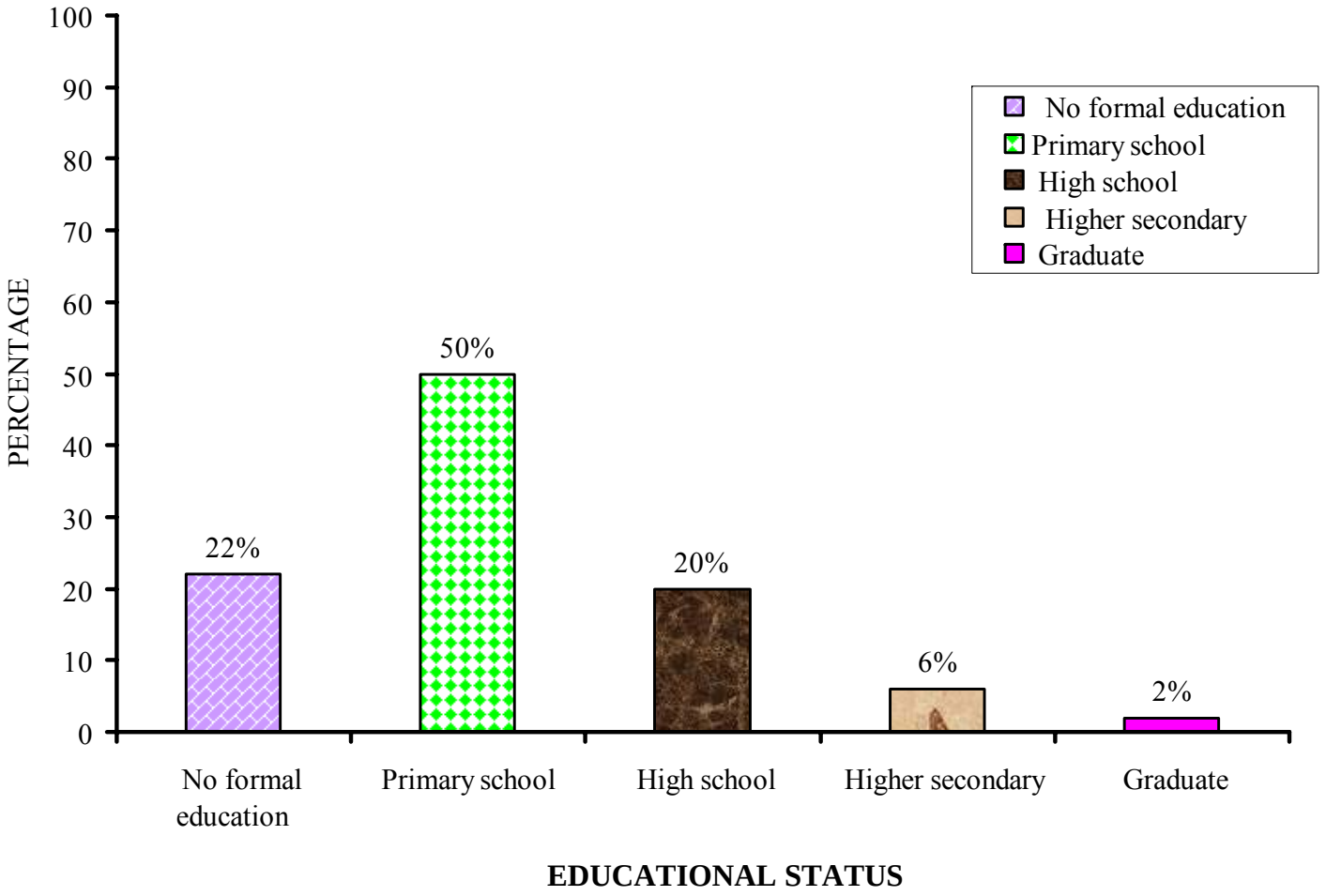


Fig 6:- Percentage distribution of old age people with osteoarthritis according to their educational status

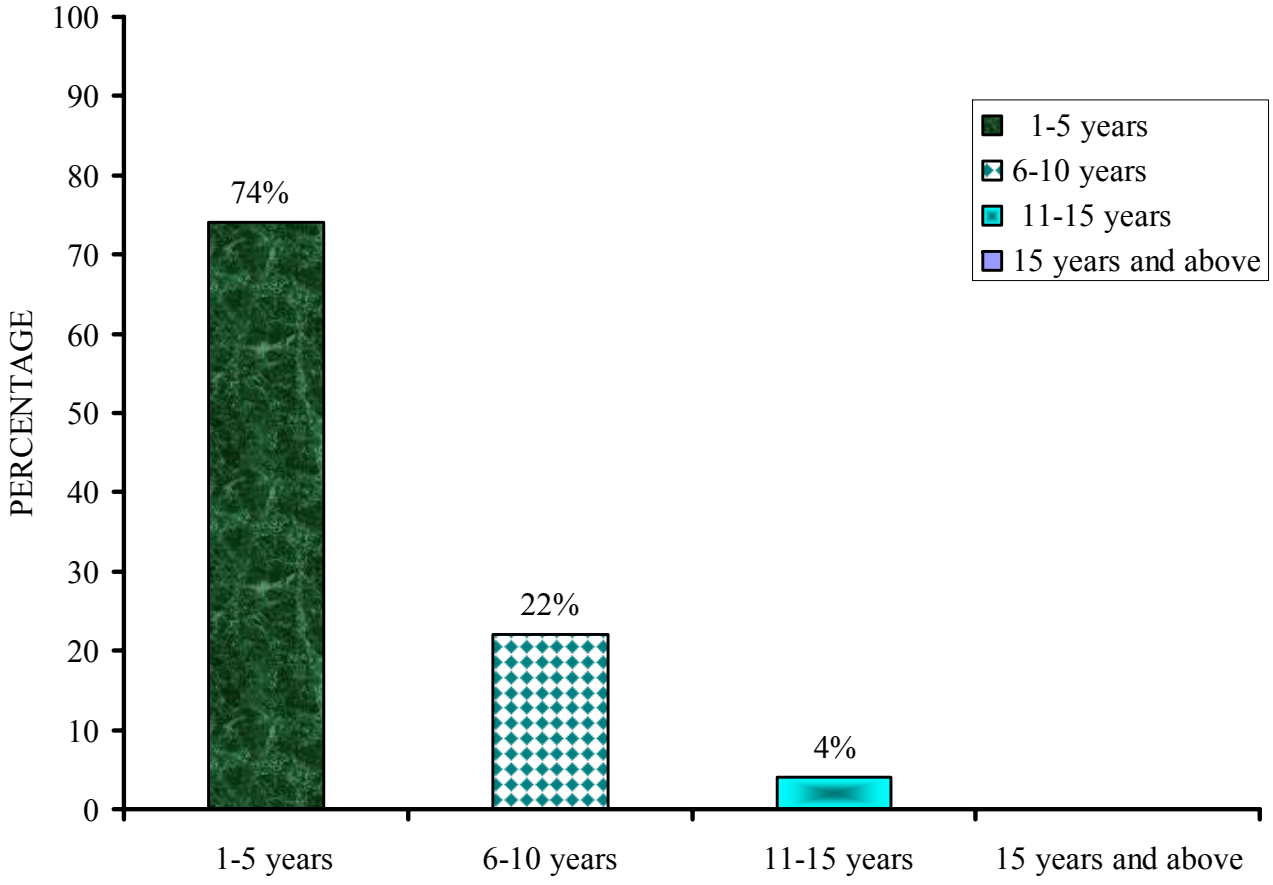


Fig 7:- Percentage distribution of old age people with osteoarthritis according to their duration of stay in old age home

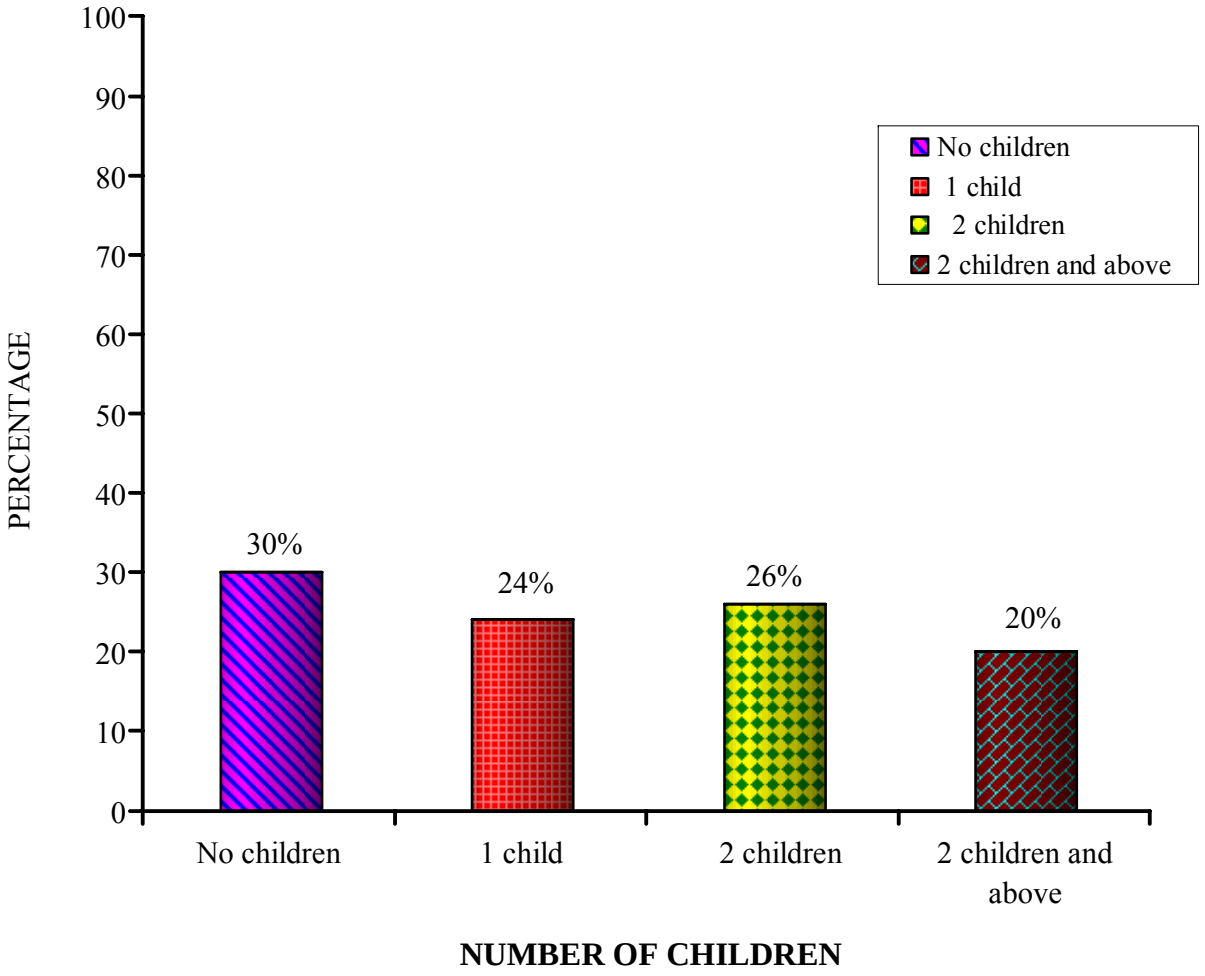


Fig 8:- Percentage distribution of old age people with osteoarthritis according to their number of children

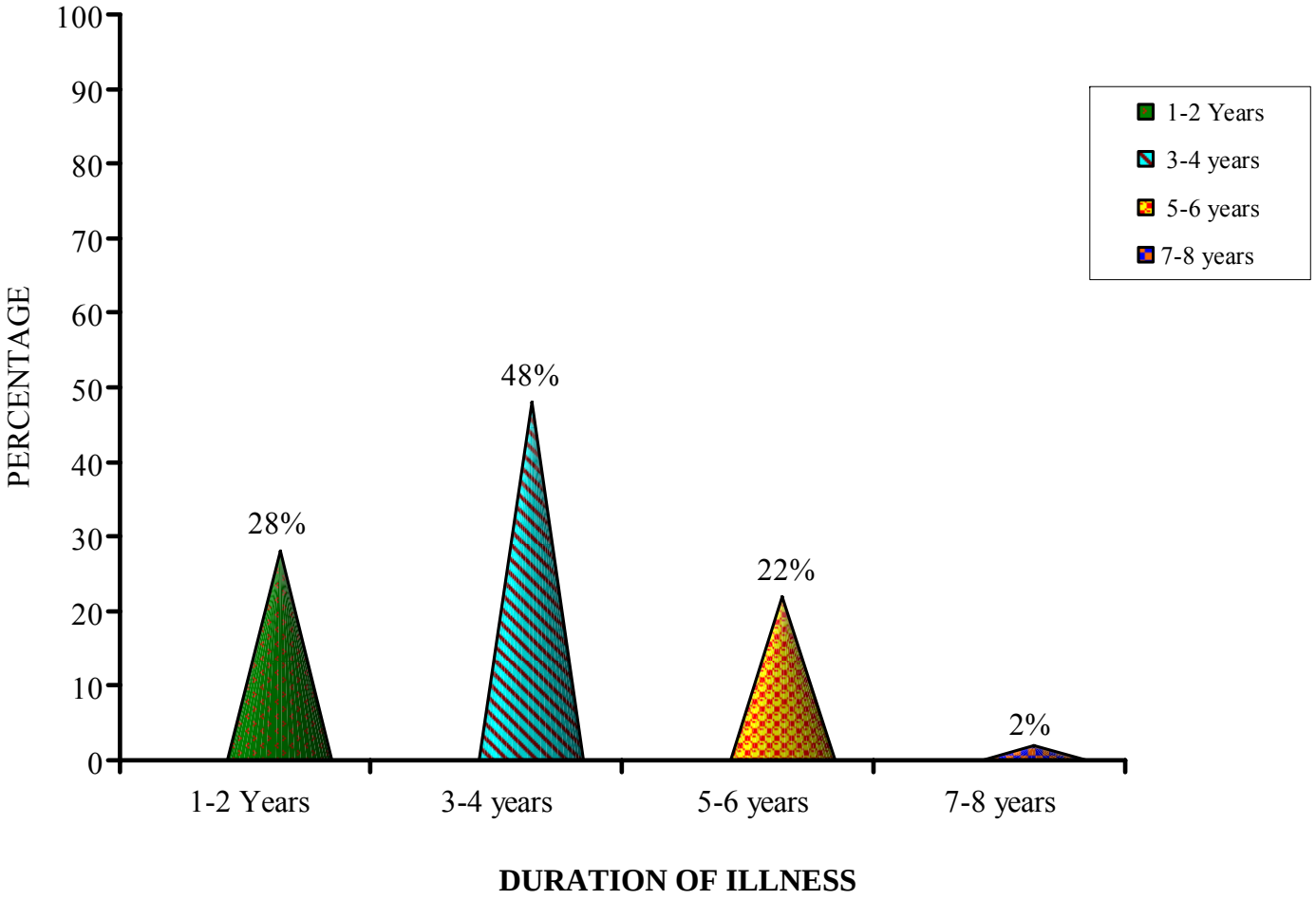


Fig 9:- Percentage distribution of old age people with osteoarthritis according to their duration of illness

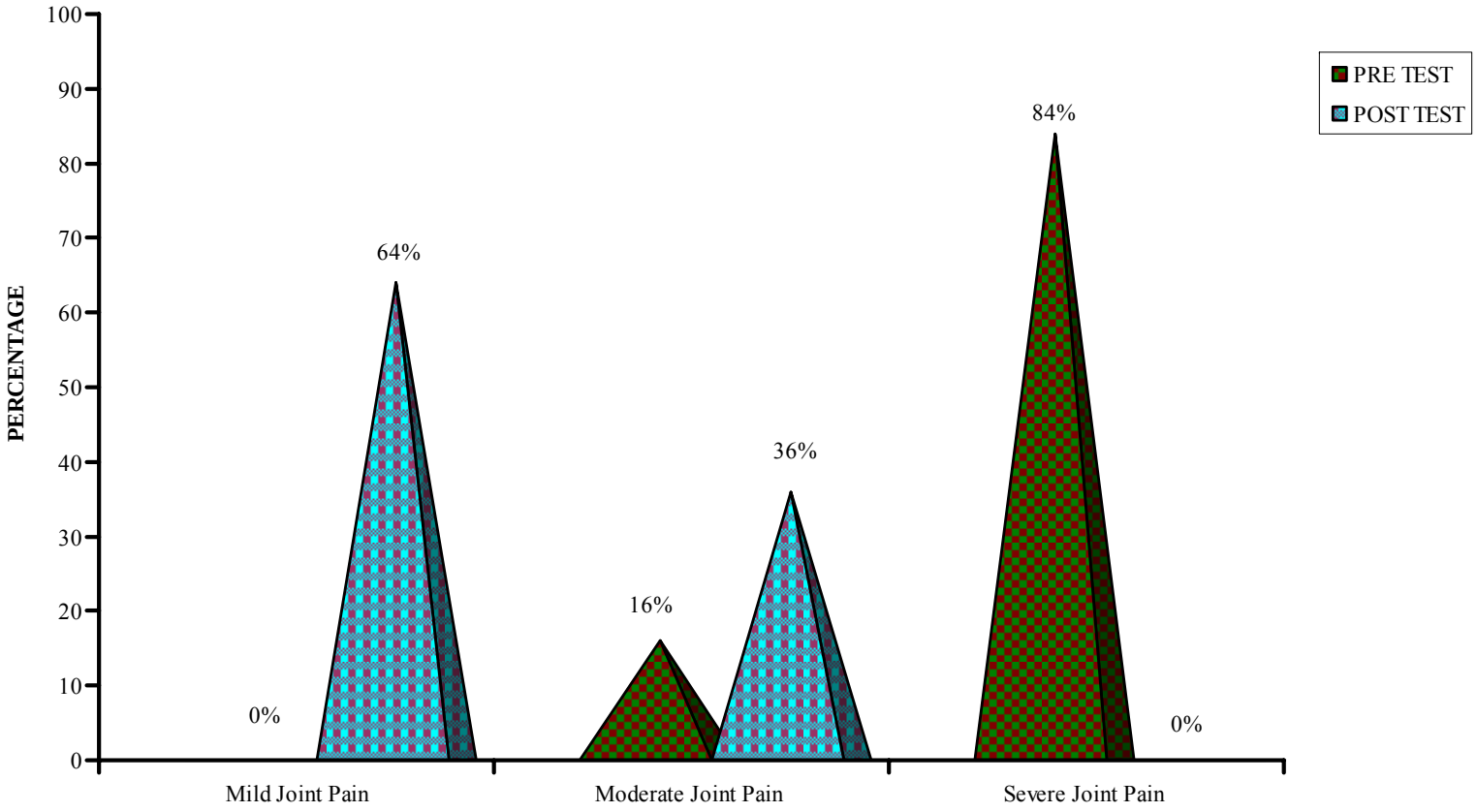
SECTION B: **Assess the pre test and post test level of joint pain among old age people with osteoarthritis**

TABLE 2: Frequency and percentage distribution of pre test and post test level of joint pain among old age people with osteoarthritis

n=50

S No	LEVEL OF JOINT PAIN	PRE TEST		POST TEST	
		F	%	F	%
1	Mild Pain (0-3)	-	-	32	64
2	Moderate Pain (4-6)	8	16	18	36
3	Severe Pain (7-10)	42	84	-	-

Table :2 depicts that in pre test majority 42(84%) had severe joint pain and 8(16%) had moderate joint pain where as in the post test 32(64%) had mild pain and 18(36%) had moderate joint pain. (Fig.10)



PRE AND POST TEST LEVEL OF JOINT PAIN

Fig 10:- Percentage distribution of comparison between pre and post test level of joint pain among old age people with osteoarthritis

SECTION C: **Assess the pre test and post test level of physical function among old age people with osteoarthritis**

TABLE 3: Frequency and percentage distribution of pre test and post test level of physical function among old age people with osteoarthritis

n=50

S.NO	LEVEL OF PHYSICAL FUNCTION	PRE TEST		POST TEST	
		F	%	F	%
1.	Mildly improved physical function (1-27)	38	76	-	-
2.	Moderately improved physical function (28-54)	12	24	42	84
3.	Highly improved physical function (55-80)	-	-	8	16

Table : 3 Shows that frequency and percentage distribution of level of physical function among old age people with osteoarthritis in pre test, 38(76%) had mildly improved physical function,12(24%) had moderately improved physical function where as in post test 42 (84%) old age people with osteoarthritis had moderately improved physical function and 8(16%) old age people with osteoarthritis had highly improved physical function. (Fig.11)

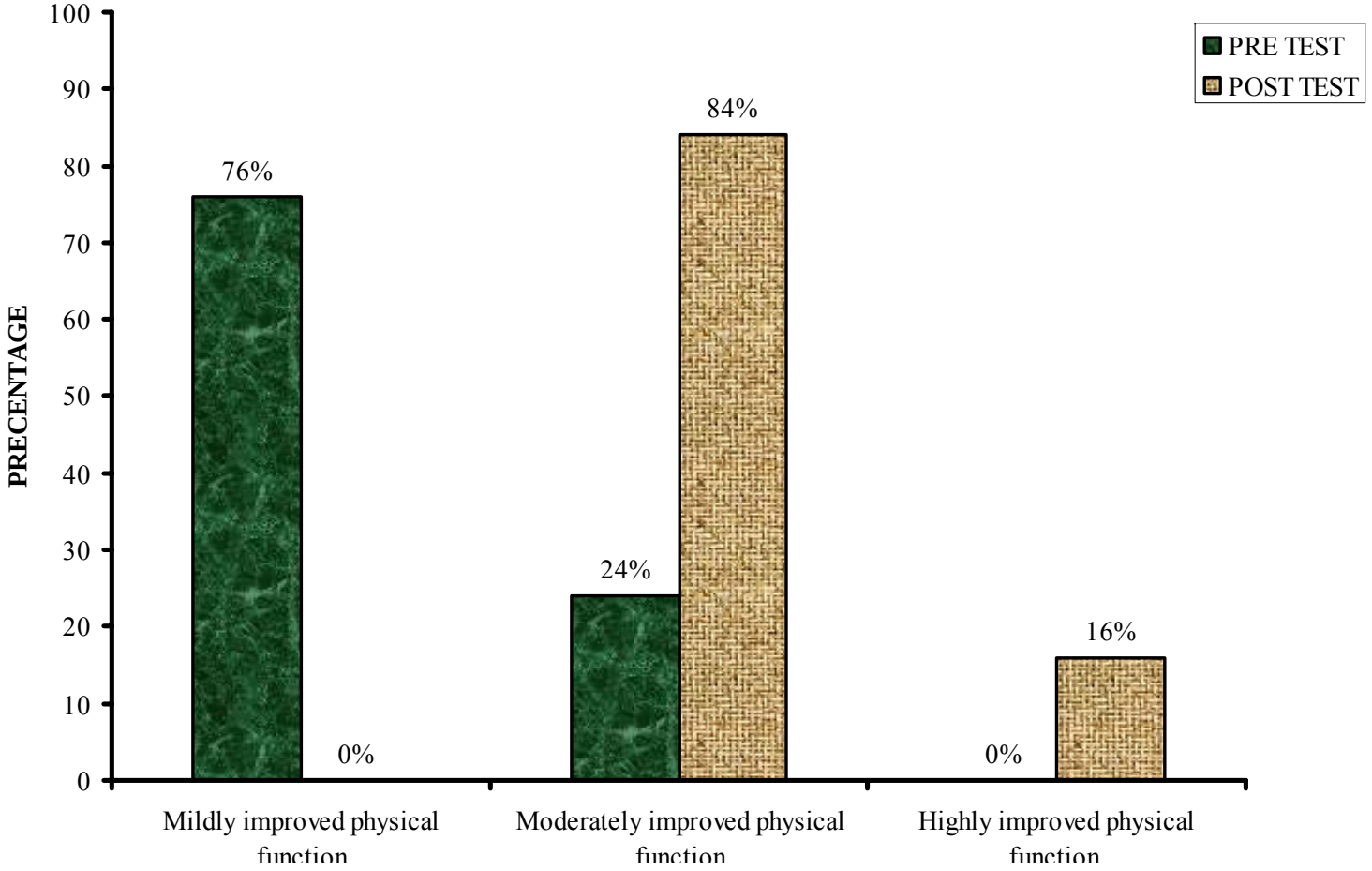


Fig 11:- Percentage distribution of comparison between pre and post test level of physical function among old age people with osteoarthritis

SECTION D: **To compare the pre and post test level of joint pain among old age people with osteoarthritis**

TABLE 4: Comparison of Mean, standard deviation and paired't' value of pre test and post test level of joint pain among among old age people with osteoarthritis

n=50

S. NO	GROUP	MEAN	SD	PAIRED "t" VALUE	TABLE VALUE
1.	Pre test	7.78	1.17	36.721	2.010
2.	Post test	3.3	1.129		

df=49 (P< 0.05)

Table : 4 Shows that mean pre test score and post test score of joint pain among old age people with osteoarthritis were 7.78(SD $\pm$ 1.17) and 3.3(SD $\pm$ 1.129) respectively. The 't' value was 36.721 which was significant at < 0.05 level

SECTION E: **To compare the pre and post test level of physical function among old age people with osteoarthritis**

TABLE 5: Comparison of Mean, standard deviation and paired 't' value of pre test and post test level of physical function among old age people with osteoarthritis

n=50

S.NO	GROUP	MEAN	SD	PAIRED "t" VALUE	TABLE VALUE
1.	Pre test	25.1	2.332	11.632	2.010
2.	Post test	38.86	9.038		

df=49 (P<0.05)

Table : 5 Shows that mean pre test score and post test score of physical function among old age people with osteoarthritis were 25.1 (SD$\pm$ 2.332) and 38.86(SD $\pm$ 9.038) respectively. The't' value was 11.632 which was significant at < 0.05 level

SECTION F : **Association of post test level of joint pain among old age people with osteoarthritis and their selected demographic variables.**

TABLE: 6 Association of post test level of joint pain among old age people with osteoarthritis and their selected demographic variables

n=50

S.NO	Demographic variables	Level of joint pain						Chi square value	Table value	Inference
		Mild joint pain		Moderate joint pain		Severe joint pain				
		F	%	F	%	F	%			
1.	**Age in years**									
1.1	60-64 years	6	12	2	4	-	-			
1.2	65-68 years	7	14	5	10	-	-	0.7713	12.59	N.S
1.3	69-72 years	10	20	5	10	-	-		(df=6)	
1.4	73-75years	9	18	6	12	-	-			
2	**Sex**									
2.1	Male	12	24	7	14	-	-	0.0092	5.99	N.S
2.2.	Female	20	40	11	22	-	-		(df=2)	
3.	**Religion**									
3.1	Hindu	22	44	10	20	-	-			
3.2	Muslim	-	-	-	-	-	-	0.9831	12.59	N.S
3.3	Christian	10	20	8	16	-	-		(df=6)	
3.4	Others	-	-	-	-	-	-			
4.	**Marital status**									
4.1	Single	5	10	-	-	-	-			
4.2	Married	7	14	8	16	-	-	5.9902	12.59	N.S
4.3	Widowed	18	36	10	20	-	-		(df=6)	
4.4	Divorced	2	4	-	-	-	-			

5.	**Educational status**									
5.1	No formal	9	18	2	4	-	-			
5.2	education	15	30	10	20	-	-			
5.3	Primary	7	14	3	6	-	-	14.8168	15.51	N.S
5.4	High school	-	-	3	6	-	-		(df=8)	
5.5	Higher secondary									
	Graduate	1	2	-	-	-	-			
6.	**Duration of stay in old age home**									
6.1	1-5 years	27	54	10	20	-	-			
6.2	6- 10 years	6	12	5	10	-	-	5.2872	12.59	N.S
6.3	11 – 15 years	-	-	2	4	-	-		(df=6)	
6.4	15 years and									
	above	-	-	-	-	-	-			
7.	**Number of children**									
7.1	No children	11	22	4	8	-	-			
7.2	1 child	8	16	4	8	-	-		12.59	
7.3	2 children	6	12	7	14	-	-	2.5571	(df=6)	N.S
7.4	2 children and									
	above	7	14	3	6	-	-			
8.	**Duration of illness**									
8.1	1 – 2 Years	12	24	2	4	-	-			
8.2	3 – 4 years	16	32	8	16	-	-	12.435	12.59	N.S
8.3	5 – 6 years	4	8	7	14	-	-		(df=6)	
8.4	7 – 8 years	-	-	1	2	-	-			

NS – not significant, S- significant (P< 0.05)

Table: 6 The Chi square values were calculated to find out the association between the post test level of joint pain among old age people with osteoarthritis and their selected demographic variables. Revealed that there was no significant association with age, sex, religion, marital status, educational status, duration of stay in old age, number of children and duration of illness among old age people with osteoarthritis.

SECTION :G **Association of post test level of physical function among old age people with osteoarthritis and their selected demographic variables**

TABLE: 7 Association of post test level of physical function among old age people with osteoarthritis and their selected demographic variables.

n=50

S.NO	Demographic variables	Level of physical function						Chi square value	Table value	Inference
		Mildly improved		Moderately improved		Highly improved				
		F	%	F	%	F	%			
1.	**Age in years**									
1.1	60-64 years	-	-	6	12	2	4		12.59	
1.2	65-68 years	-	-	10	20	2	4	2.4234	(df=6)	N.S
1.3	69-72 Years	-	-	12	24	3	6			
1.4	73-75 Years	-	-	14	28	1	2			
2.	**Sex**							0.6846	5.59	N.S
2.1	Male	-	-	17	34	2	4		(df=2)	
2.2	Female	-	-	25	50	6	12			
3.	**Religion**									
3.1	Hindu	-	-	25	50	7	14			
3.2	Muslim	-	-	-	-	-	-	2.2826	12.59	N.S
3.3	Christian	-	-	17	34	1	2		(df=6)	
3.4	Others	-	-	-	-	-	-			
4.	**Marital status**									
4.1	Single	-	-	4	8	1	2			
4.2	Married	-	-	15	30	-	-	4.9835	12.59	N.S
4.3	Widowed	-	-	21	42	7	14		(df=6)	
4.4	Divorced	-	-	2	4	-	-			

5.	**Educational status**									
5.1	No formal education	-	-	8	16	3	6			
5.2	Primary	-	-	21	42	4	8			
5.3	High school	-	-	10	20	-	-	9.525	15.51 (df=8)	N.S
5.4	Higher secondary	-	-	3	6	-	-			
5.5	Graduate	-	-	-	-	1	2			
6.	**Duration of stay in old age home**									
6.1	1-5 years	-	-	29	58	8	16			
6.2	6- 10 years	-	-	11	22	-	-	3.3461	12.59 (df=6)	N.S
6.3	11 – 15 years	-	-	2	4	-	-			
6.4	15 years and above	-	-	-	-	-	-			
7.	**Number of children**									
7.1	No children	-	-	12	24	3	6			
7.2	1 child	-	-	10	20	2	4	4.118	12.59 (df=6)	N.S
7.3	2 children	-	-	13	26	-	-			
7.4	2 children and above	-	-	7	14	3	6			
8.	**Duration of illness**									
8.1	1 – 2 Years	-	-	9	18	5	10			
8.2	3 – 4 years	-	-	21	42	3	6	16.992	12.59 (df=6)	S
8.3	5 – 6 years	-	-	11	22	-	-			
8.4	7 – 8 years	-	-	1	2	-	-			

NS – not significant, S- significant **(P< 0.05)**

Table: 7 The Chi square values were calculated to find out the association between the post test level of physical function among old age people with osteoarthritis and their selected demographic variables. Revealed that there was no significant association with age, sex, religion, marital status, educational status, duration of stay in old age home, number of children except for duration of illness(χ^2 =16.992) among old age people with osteoarthritis.

CHAPTER – V

DISCUSSION

The discussion chapter deals with description of sample characteristics and objectives of the study. The aim of this present study was to assess the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St.Joseph Home for aged and destitute, at Coimbatore.

Description of demographic variables of old age people with osteoarthritis.

Regarding age, majority of old age people with osteoarthritis 15(30%) were in the age group 69- 72 years and 73- 75 years. 12(24%) were in the age group of 65 -68 years and 8(16%) were in the age group of 64 – 68 years. This study was consistent with the findings of **Arden N. et.al.(2005).** Radiographic evidence of OA occurs in the majority of people by 65 years of age and in about 80% of those aged over 75 years.

Percentage distribution of old age peoples according to their sex shows that, majority of 31 (62%) were female and 19 (38%) were male. This study was consistent with the findings of **Srikanth VK.et.al.,(2005)** Males aged <55 years had a greater risk of prevalent cervical spine OA [RR 1.29, 95% CI 1.18-1.41].Males also had significantly reduced rates of incident OA in the knee. Females, particularly those > or = 55 years, tended to have more severe OA in the knee but not other sites. The results demonstrate the presence of sex differences in OA prevalence and incidence, with females generally at a higher risk. Females also tend to have more severe knee OA, particularly after menopausal age.

Regarding religion, majority 32 (64%) were Hindu and 18 (36%) were Christian

Regarding marital status, majority 28 (56%) were widowed, 15 (30%) were married, 5(10%) were single and 2(4%) were divorced.

Regarding educational status, majority 25(50%) had primary education, 11 (22%) had no formal education, 10 (20%) had high school education, 3(6%) had higher secondary education and 1(2%) were graduate.

Regarding duration of stay in old age home, majority 37(74%) were staying for 1-5 years, 11(22%) were staying for 6-10 years and 2(4%) were staying for 11 -15 years .

Regarding number of children, majority 15(30%) had no children, 13(26%) had 2 childrens, 12 (24%) had 1 child and 10 (20%) had 2 children and above.

Regarding duration of illness, majority 24(48%) of them were suffering for 3-4 years, 14(28%) of them were suffering for 1-2 years, 11(22%) of them were suffering for 5-6 years, and 1(2%) person was suffering for 7-8 years.

The findings of the study as per the objectives were discussed under the following heading.

1) Assess the pretest and post test level of joint pain among old age people with osteoarthritis
2) Assess the pretest and post test level of physical function among old age people with osteoarthritis
3) To compare the pre and post test level of joint pain among old age people with osteoarthritis
4) To compare the pre and post test level of physical function among old age people with osteoarthritis
5) Association between the post test level of joint pain among old age people with osteoarthritis and their selected demographic variables
6) Association between the post test level of physical function among old age people with osteoarthritis and their selected demographic variables

FIRST OBJECTIVE:

Assess the pretest and post test level of joint pain among old age people with osteoarthritis

The data analysis depicts that in pre test majority 42(84%) had severe joint pain and 8(16%) had moderate joint pain where as in the post test 32(64%) had mild pain and 18(36%) had moderate joint pain.

The findings are consistent with the findings of **Thomas KS.et.al., (2002)** WOMAC Osteoarthritis index; SF-36 questionnaire was used. The result of this study was 600(76.3%) participants completed the study. At 24 months highly significant reductions in knee pain were apparent for the pooled exercise groups compared with the non exercise groups (mean difference -0.82, 95% confidence interval-13 to 0.3) similar improvements were observed at 0.12 and 18 month. The reduction in pain was greater the closed patients adhered to the exercise plan. A simple home based exercise programme can significantly reduce knee pain.

SECOND OBJECTIVE

Assess the pretest and post test level of physical function among old age people with osteoarthritis

The data analysis Showed that frequency and percentage distribution of level of physical function among old age people with osteoarthritis in pre test , 38(76%) had mildly improved physical function,12(24%) had moderately improved physical function where as post test 42 (84%) of old age people with osteoarthritis had moderately improved physical function and 8(16%) of old age people with osteoarthritis had highly improved physical function

The study findings are consistent with the findings of **Jennifer E.et.al.,(2009)** . Lower body strength improved from baseline to 12 weeks in the strength training versus control group (32.2%-7.3%, respectively; P = .004). Physical function improved in the strength training group over 12 weeks (range, 7%-50%; $P < .05$), with no change in control group. Adherence to the

intervention was 82% ± 16%.These results demonstrate the efficacy of this program and its potential to be disseminated as an evidence-based strength training intervention to improve physical function and strength among older women with osteoarthritis

THIRD OBJECTIVE

To compare the pre and post test level of joint pain among old age people with osteoarthritis

The study findings showed that mean pre test and post test score of physical function among old age people with osteoarthritis were 25.1(SD $\pm$ 2.332) and 38.86 (SD$\pm$ 9.038) respectively. The't' value was 11.6324 which was significant at < 0.05 level

The study findings are consistent with the findings of **Liu CJ et.al., (2009)** PRT resulted in a small but significant improvement in physical ability (33 trials, 2172 participants; SMD 0.14, 95% CI 0.05 to 0.22). Functional limitation reassurances also showed improvements PRT had a large positive effect on muscle strength (73 trails, 3059 participants, SMD 0.84, 95% (I 0.67 to 1.00). Participants with osteoarthritis reported a reduction in pain following PRT (6 trials, 503 participants, SMD – 0.30, 95% (I – 0.48 to – 0.13). PRT is an effective intervention for improving physical functioning in older people, including improving strength and the performance of some simple and complex activities.

H_{1-} : The mean post test level of joint pain score is significantly lower than the mean pretest joint pain among old age people with osteoarthritis was accepted

FOURTH OBJECTIVE

To compare the pre and post test level of physical function among old age people with osteoarthritis

The study findings showed that mean pre test and post test score of physical function among old age people with osteoarthritis were 25.1 (SD$\pm$ 2.332) and 38.86 (SD $\pm$ 9.038) respectively. The 't' value was 11.6324 which was significant at < 0.05 level

The study finding is consistent with the study findings of **Oida Y. et al (2008)** The effect of the intervention was 0.44 for WOMAC score, 0.23 for peak torque during knee extension 0.64 for knee flexion, 0.32 for Rom, 0.81 for standing ability and extension, 0.64 for knee flexion 1.13 for waking ability. These results suggested that the exercise program for elderly people with knee OA improved knee pain and physical function.

H_2: The mean post test level of physical function score is significantly higher than the mean pretest physical function score among old age people with osteoarthritis was accepted

FIFTH OBJECTIVE

Association of post test level of joint pain with their selected demographic variables among old age people with osteoarthritis

Chi square values were calculated to find out the association between the post test level of joint pain among old age people with osteoarthritis and their selected demographic variables. Revealed that there was no significant association with age, sex, religion, marital status, educational status, duration of stay in old age, number of children, duration of illness among old age people with osteoarthritis.

H_3: There will be a significant association between the post test level of joint pain score among old age people with osteoarthritis and their selected demographic variables was rejected

SIXTH OBJECTIVE

Association of post test level of physical function with their selected demographic variables among old age people with osteoarthritis

Chi square values were calculated to find out the association between the post test level of physical function among old age people with osteoarthritis and their selected demographic variables. Revealed that there was no significant association with age, sex, religion, marital status, educational status, duration of stay in old age, number of children except for duration of illness (χ^2 =16.992) among old age people with osteoarthritis.

H_4: There will be a significant association between the post test level of physical function score among old age people with osteoarthritis and their selected demographic variables was rejected except for duration of illness (χ^2 =16.992) among old age people with osteoarthritis.

CHAPTER – VI

SUMMARY, CONCLUSION, IMPLICATION, RECOMMENDATIONS AND LIMITATIONS

This chapter includes

1. Summary of the study
2. Conclusion
3. Implications for nursing
4. Recommendations
5. Limitations

SUMMARY OF THE STUDY

The focus of the study was to assess the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St.Joseph Home for aged and destitute, at Coimbatore.

The design used for this study was pre Experimental one group pre test post test in design. The conceptual frame work was based on modified Wiedenbech's helping art of clinical nursing theory. 50 participants were selected by purposive sampling technique and were assessed for level of joint pain and physical function before and after muscle strengthening exercises. The data was collected to assess the level of joint pain and physical function by using numerical pain intensity scale, modified WOMAC Osteoarthritis index scale

Day 1, sample was diagnosed by physician. Day 1 and Day 2 pre test was done for 50 samples.25 samples in each day. The researcher was spending 5-10 minutes for each sample to conduct the pretest. After collecting the demographic variables, numerical pain intensity scale was used to assess the joint pain and WOMAC osteoarthritis scale was used to assess the physical function among old age people with osteoarthritis. The samples were divided into 3 groups with 17 members in group1 and 2, and 16 Members in group 3. The researcher demonstrated and assisted in doing the muscle strengthening

exercises for all 3 groups separately. It was continued for 30 days daily morning and evening .Morning session was between 10.00 am to 12.00pm and in evening session was between 3.30 pm- 5.30 pm. Post test was conducted for 2 days, 25 members in each day. Level of joint pain and physical function were assessed by using same scale. The data were analyzed by using descriptive and inferential statistics

Major findings of the study

- Majority 15(30%) were in the age group 69- 72 years and 73- 75 years
- Majority 31 (62%) were females
- Majority 32 (64%) were Hindus
- Majority 28 (56%) were widowed
- Majority 25(50%) had primary education
- Majority 37(74%) were staying for 1-5 years
- Majority of them 15(30%) had no children
- Majority 24(48%) of them were suffering with osteoarthritis for 3-4 years
- In pre test , 42(84%) had severe joint pain and 8(16%) had moderate joint pain where as in the post test 32(64%) had mild pain and 18(36%) had moderate joint pain.
- In pre test , 38(76%) had mildly improved physical function,12(24%) had moderately improved physical function where as in post test 42 (84%) old age people with osteoarthritis had moderately improved physical function and 8(16%) old age people with osteoarthritis had highly improved physical function
- Mean pre test score and post test score of joint pain among old age people with osteoarthritis were 7.78(SD $\pm$ 1.17) and 3.3 (SD$\pm$ 1.129) respectively. The 't' value was 36.721 which was significant at < 0.05 level
- Mean pre test score and post test score of physical function among old age people with osteoarthritis were 25.1 (SD$\pm$ 2.332) and 38.86

(SD± 9.038) respectively. The 't' value was 11.6324 which was significant at < 0.05 level

- There is no Significant association between post test level of joint pain among old age people with osteoarthritis with their selected demographic variables
- Significant association were found between post test level of physical function and duration of illness (χ^2 =16.992) among old age people with osteoarthritis

The study findings revealed that the post test joint pain score was significantly reduced after practicing muscle strengthening exercises. Findings showed that practicing muscle strengthening exercises such as isometric, isotonic and isokinetic exercises played an important role in reducing joint pain and improve the physical function among old age people with osteoarthritis

CONCLUSION

The present study was done to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis. The result showed that, the mean post test scores of joint pain3.3 (SD ± 1.129) which was significantly lower than the mean pretest scores 7.78(SD ± 1.17). The mean post test scores of physical function 38.86 (SD ± 9.038) which was significantly higher than the mean pretest scores 25.1 (SD± 2.332). The't' value of joint pain score was 36.721 and physical function score was 11.632 which were significant at < 0.05 level.

Therefore practicing muscle strengthening exercises will reduce joint pain and improve physical function among old age people with osteoarthritis. which is non expensive.

IMPLICATIONS

The findings of the study have certain important implications for nursing service, education, administration and nursing research.

Nursing service

- Old age people must be encouraged to practice regular muscle strengthening exercises
- Nurse as the change agent, can introduce health teaching by using CD regarding muscle strengthening exercises in geriatrics OPD clinic
- Prepare and issue booklet regarding muscle strengthening exercises to geriatric clients

Nursing education

- Imparting the concepts of muscle strengthening exercises to nursing students by conducting workshop and conference
- Nursing students can update knowledge on muscle strengthening exercise to give health education in the hospitals, and in community.

Nursing administration

- Nursing personnel can organize continuing nursing education program on muscle strengthening exercises to the nursing personnel.
- Nursing administrator has more responsibility as supervisor on creating awareness among old age people with osteoarthritis regarding muscle strengthening exercises by facilitating free distribution of booklets, handouts, regularly in out patient department of hospitals, health clinics in urban and rural

Nursing research

- The study findings can be a baseline for further studies to build upon for improving the body of knowledge in nursing
- The study findings can be effectively utilized by the emerging researchers.

RECOMMENDATIONS

1. A longitudinal study can be undertaken to assess the joint pain and physical function on practicing strengthening exercise among old age people
2. Comparative study can be done to find the effectiveness of muscle strengthening exercises with non pharmacological management among old age people with osteoarthritis
3. Effectiveness of use of video teaching programme regarding muscle strengthening exercises can be done among old age people
4. This similar study can be done having control and experimental group

LIMITATION

1. It was more time consuming to explain the old age people because of difference in their level of understanding.

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APPENDIX – A

BISHOP'S COLLEGE OF NURSING

(C.S.I. Trichy - Tanjore Diocese)
C.S.I. Mission Compound, **DHARAPURAM** - 638 656,
Tiruppur District.

☎ Off: **04258** - **221224**
223962
Fax : **04258 221224**
E - Mail; principalbcn@sify.com

Ref: BCN/133/Per.File/6/2011-12.

Date.....
07.06.2011

To,

The Correspondent,
R.C.Oldage Home,
Dharapuram.

Respected Sir,

This is to certify that Ms.V.Florence Vinoliya is a bonafide student of our college doing her M.Sc.,(N) programme II year. As part of her requirement under, The Tamil Nadu Dr.MGR. Medical University, Chennai, she has to do a project on "A study to assess the effectiveness selected exercises on reduction of joint pain and improving physical function "

Kindly permit her to carryout the pilot study in your home.

Thanking you,

Yours faithfully,

PRINCIPAL,
BISHOP'S COLLEGE OF NURSING,
C.S.I.MISSION COMPOUND,
DHARAPURAM-638 656,
TIRUPUR DISTRICT.

Permitted

DIRECTOR
St. Joseph's Home for Aged
DHARAPURAM - 638 656.
Erode District.
Tamil Nadu.

BISHOP'S COLLEGE OF NURSING

(C.S.I. Trichy - Tanjore Diocese)
C.S.I. Mission Compound, **DHARAPURAM** - 638 656,
Tiruppur District.

☎ Off: **04258 - 221224**
223962
Fax : **04258 221224**
E - Mail; principalbcn@sify.com

Ref :

Date..17.06.2011.....

To,

The Correspondent,
St.Joseph Home for Aged and Destitution,
Mettur Road,
Podanur,
Coimbatore.

Respected Sir,

This is to certify that Ms.V.Florence Vinoliya is a bonafide student of our college doing her M.Sc.,(N) programme II year. As part of her requirement under, The Tamil Nadu Dr.MGR. Medical University, Chennai, she has to do a project on "A study to assess the effectiveness selected exercises on reduction of joint pain and improving physical function among Geriatrics in St.Joseph Home for Aged and Destitution at Coimbatore. "

Kindly permit her to carryout the study in your home.

Thanking you,

Yours faithfully,

PRINCIPAL,
BISHOP'S COLLEGE OF NURSING,
C.S.I.MISSION COMPOUND,
DHARAPURAM-638 656,
TIRUPUR DISTRICT.

Sr. Alphonsa
Sister Superior
St.Joseph's Home For Aged & Destitute
PODANUR P.O.
Coimbatore-641 023. India.

APPENDICES – B

LETTER SEEKING FOR EXPERT'S OPINION FOR CONTENT VALIDITY

From

Ms. V. Florence Vinoliya ,
M.Sc. (Nursing) II year,
Bishop's College of Nursing,
Dharapuram.

To

Respected Madam/Sir,

SUB : Requisition for content validity of tool

I am M.Sc. (Nursing) second year student of Bishop's College of Nursing, Dharapuram, under Dr. M.G.R Medical University, Chennai. As a partial fulfillment of my M.Sc.(N) Degree Programme, I am conducting a research on **"A study to assess the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St. Joseph home for aged and destitute at Coimbatore.** One of the initial steps of the research study is to develop a tool. I am sending the above stated for content validity and for your expert and valuable opinion.

I will be very thankful to return it to the undersigned.

Your's sincerely,

Encl ; **(V. Florence Vinoliya**)

1. Certificate of content validity
2. Statement of problem, objectives, operational definition, hypothesis
3. Description of the tool and tool for data collection
4. Self addressed envelope

APPENDICES – C
MEDICAL SURGICAL NURSING

LIST OF EXPERS FOR VALIDATION

1) Dr.N.Sekar MBBS, M,S ortho, MCh (Plastic)

   Orthopaedic surgeon,

   Sri sai clinic and hospitals

   Dharapuram,

   Tirupur district

2) Prof . Mr.Victor Devasirvadam,

   Vice principal,

   Sara nursing college of nursing,

   Dharapuram,

   Tirupur district

3) Prof. Mr.kuzhanthaivelu, M.Sc(N),Ph.D(N)

   Head of Medical Surgical Nursing,

   KMCH college of nursing,

   Coimbatore

4) Prof. Mr. Balasubramaniam, M.Sc(N)

   Medical surgical nursing dept

   KMCH college of nursing,

   Coimbatore

5) Dr. Mrs. Sara, Ph.D(N).,
   HOD, Medical Surgical Nursing Department
   Rani meyammai college of nursing,
   Annamalai university,
   Chithambaram

APPENDICES – D

CERTIFICATE FOR VALIDITY

This is to certify that the interview schedule and attitude scale on "A study to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St. Joseph old age for aged and destitute at Coimbatore" has been validated by me and found appropriate with mentioned suggestions.

Signature : Dr. N. Sekar, M.B.B.S., M.S. Ortho, MCh.(Plastic)

Name :

Designation :

Hospital :

CERTIFICATE FOR VALIDITY

This is to certify that the interview schedule and attitude scale on "A study to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St. Joseph old age for aged and destitute at Coimbatore" has been validated by me and found appropriate with mentioned suggestions.

Signature :

Name : S. Victor Devasirvadam M.sc(N) Ph.D(N)

Designation : Vice Principal.

College : Sara Nursing College Dharapuram

SARA NURSING COLLEGE
ERODE DISTRICT.
DHARAPURAM.

CERTIFICATE FOR VALIDITY

This is to certify that the interview schedule and attitude scale on "A study to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St. Joseph old age for aged and destitute at Coimbatore" has been validated by me and found appropriate with mentioned suggestions.

Signature : P. Kuzhanthivel.

Name : P. KUZHANTHAIVEL

Designation : ASSOCIATE PROFESSOR

College : KMCH COLLEGE OF NURSING, POST BOX: 3209, AVINASHI ROAD, COIMBATORE – 14.

CERTIFICATE FOR VALIDITY

This is to certify that the interview schedule and attitude scale on "A study to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St. Joseph old age for aged and destitute at Coimbatore" has been validated by me and found appropriate with mentioned suggestions.

Signature : K. Balasubramanian.

Name : K. BALASUBRAMANIAN.

Designation : Professor.

College : Kmat college of Nursing Coimbatore-14.

APPENDICES – E

CERTIFICATE OF ENGLISH EDITING

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation work, **A study to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St.Joseph Home for aged and destitute, at Coimbatore** done by **MRS.V.FLORENCE VINOLIYA II year M.Sc (Nursing)** student of Bishop's college of Nursing, Dharapuram is edited for English language appropriateness by P. SAMPATH

Date :

Address :

Signature
(P. SAMPATH)

P. SAMPATH, M.A.,M.Phil.,M.Ed.,
Lecturer in English,
Maharani Teacher Training Institute,
Dharapuram.

APPENDICES – F

CERTIFICATE OF TAMIL EDITING

TO WHOM SO EVER IT MAY CONCERN

This is to certify that the dissertation work, **A study to evaluate the effectiveness of muscle strengthening exercises on joint pain and physical function among old age people with osteoarthritis in St.Joseph Home for aged and destitute, at Coimbatore** done by MRS.V.FLORENCE VINOLIYA II year M.Sc (Nursing) student of Bishop's college of Nursing, Dharapuram is edited for Tamil language appropriateness by தா.மு.செந்தில்குமார்

Date :

Signature

Address :

D.M.SENTHIL KUMAR, M.A.,B.Ed.,M.Phil.
Guest Lecturer.
Department of Tamil,
Alagappa University Study Centre,
DHARAPURAM - 638656.

DEMOGRAPHIC VARIABLES

1. Age
    a. 60-64 years
    b. 65-68 years
    c. 69-72 years
    d. 73 -75years

2. Sex
    a. Male
    b. female

3. Religion
    a. Hindu
    b. Muslim
    c. Christian
    d. Others

4. Marital status
    a. Single
    b. Married
    c. Widow
    d. divorce

5. Educational status
    a. No formal education
    b. Primary education
    c. High school education
    d. Higher secondary education
    e. Graduate

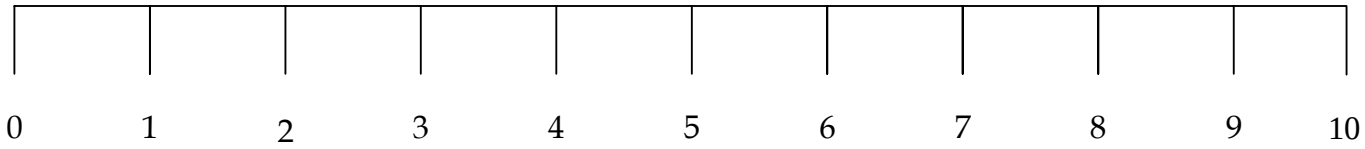
6. Duration of stay in old age home
    a. 1-5 years
    b. 6-10 years
    c. 11-15 years
    d. 15 years and above

7. Number of children
    a. No children
    b. one child
    c. two children
    d. More than 2 children

8. Duration of the illness
    a. 1 – 2 years
    b. 3 – 4 years
    c. 5 – 6 years
    d. 7 – 8 years

INSTRUMENT USED TO ASSESS THE LEVEL OF JOINT PAIN BY USING

NUMERICAL PAIN INTENSITY SCALE



NUMERICAL PAIN INTENSITY SCALE

SCORE INTERPRETATION AS FOLLOWS

S.NO	LEVEL OF JOINT PAIN	SCORE	PERCENTAGE
1	Mild pain	0 -3	0 - 33
2	Moderate pain	4 – 6	34 – 66
3	Severe pain	7 – 10	67 – 100

ASSESSMENT OF PHYSICAL FUNCTION BY MODIFIED WOMAC OSTEOARTHRITIS INDEX SCALE DEVELOPED BY NICHOLAS BELLAMY (1994)

Items	Not able to perform 1	With assistance 2	Independently with difficulty 3	Independently Without difficulty 4
Difficulty in performing daily activities 1. Going down stairs 2. Going upstairs 3. Getting up from a sitting position 4. Bending and picking things from down 5. Walking on flat surface 6. Getting in and out of vehicle 7. sitting cross legged on floor 8. Rising from cross legged position 9. Sitting in squatting position 10. Washing clothes sitting on floor 11. Getting out of bed 12. Lying in bed 13. Sitting in the floor from standing position 14. sitting in a chair 15. Standing from sitting on the floor				

16. cleaning the rooms 17. Maintaining personal hygiene(brushing, hair combing) 18. Transferring bed to chair 19. Put on button shirt / blouse 20. Getting in and out off bathing				

SCORE INTERPRETATION AS FOLLOWS

S.NO	PHYSICAL FUNCTION	SCORE	PERCENTAGE
1	Mildly improved physical function	1 – 27	1 – 33
2	Moderately improved physical function	28 – 54	34 – 66
3	Highly improved physical function	55 – 80	67 – 100

சுய குறிப்பேடு

1. வயது

அ) 60 - 64 வயது

ஆ) 65 - 68 வயது

இ) 69 - 72 வயது

ஈ) 73 - 75 வயது

2. பாலினம்

அ) ஆண்

ஆ) பெண்

3. மதம்

அ) இந்து

ஆ) முஸ்லிம்

இ) கிறிஸ்தவர்

ஈ) பிற மதத்தவர்

4. திருமணத் தகுதி

அ) திருமணமாகாதவர்

ஆ) திருமணமானவர்

இ) விதவை

ஈ) விவாகரத்தானவர்

5. கல்வித் தகுதி

அ) படிக்காதவர்

ஆ) ஆரம்பக் கல்வி

இ) உயர்நிலைப் பள்ளி

ஈ) மேல்நிலைப் பள்ளி

உ) பட்டபடிப்பு

6. எத்தனை நாட்களாக முதியோர் இல்லத்தில் இருக்கிறீர்?

அ) 1 - 5 வருடம்

ஆ) 6 - 10 வருடம்

இ) 11 - 15 வருடம்

ஈ) 15 வருடத்திற்கு மேல்

7. குழந்தைகளின் எண்ணிக்கை

அ) குழந்தையின்மை

ஆ) 1 குழந்தை

இ) இரண்டு குழந்தை

ஈ) இரண்டு குழந்தைக்கு மேல்

8. வியாதிப்பட்டிருக்கும் காலங்கள்

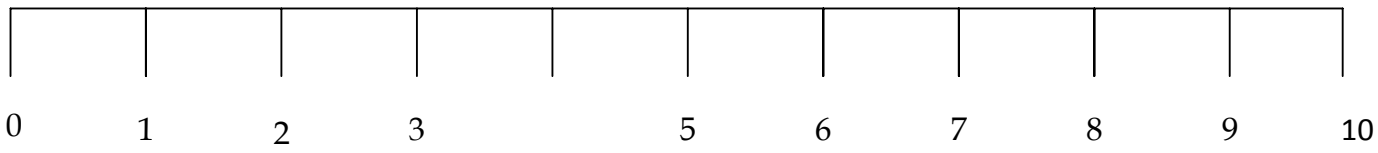
அ) 1 - 2 வருடம்

ஆ) 3 - 4 வருடம்

இ) 5 - 6 வருடம்

ஈ) 7 - 8 வருடம்

வலியின் அளவை கண்டறியும் அளவுகோல்



கேள்விகள்

வ. எண்	பொருடளக்கம்	செய்ய முடியவில்லை	உதவியுடன் செய்தல்	தனியாக செய்வதில் கடினம்	தனியாக செய்ய முடிகிறது
		1	2	3	4
	தினசரி வேலைகள் செய்வதில் கஷ்டங்கள்				
1.	படிகளிலிருந்து கீழிறங்குதல்				
2.	படிகளிலிருந்து மேலேறுதல்				
3.	அமர்ந்த நிலையிலிருந்து எழுந்திருத்தல்				
4.	கீழே குனிந்து பொருட்களை எடுத்தல்				
5.	சமமான தரையில் நடத்தல்				
6.	வாகனங்களில் ஏறி இறங்குதல்				
7.	முழங்கால்களை குறுக்காக வைத்து அமருதல்				
8.	முழங்கால்களை குறுக்கான நிலையிலிருந்து எடுத்து எழுந்திருத்தல்				
9.	குந்தி உட்காருதல்				
10.	சமமான தரையில் அமர்ந்து துணிகளை துவைத்தல்				
11.	படுக்கையிலிருந்து எழுத்திருத்தல்				
12.	படுக்கையில் படுத்தல்				

வ. எண்	பொருடளக்கம்	செய்ய முடியவில்லை	உதவியுடன் செய்தல்	தனியாக செய்வதில் கடினம்	தனியாக செய்ய முடிகிறது
		1	2	3	4
13.	நின்ற நிலையிலிருந்து அமருதல்				
14.	நாற்காலியில் உட்காறுதல்				
15.	தரையிலிருநது எழுந்திருத்தல்				
16.	அறைகளை சுத்தம் செய்தல்				
17.	தன் சுத்தத்தைப் பராமரித்தல் (பல் துலக்குதல், முடிவாருதல்)				
18.	படுக்கையிலிருந்து நாற்காலிக்கு மாறுதல்				
19.	சட்டை / இரவிக்கைக்கு பித்தான் போடுதல்				
20.	குளிப்பதற்கு உள்ளே சென்று வெளியே வருதல்				

APPENDIX – H

INFORMATION BOOKLET ON

MUSCLE STRENGTHENING EXERCISES

DEFINITION OF EXERCISE:

Active exertion of muscles involving the contraction and relaxation of muscle groups is termed exercise.

GOAL OF EXERCISE

Exercise reduces joint pain and stiffness, increases flexibility, muscle strength and endurance, and improves the physical well being

MUSCLE STRENGTHENING EXERCISES

Muscle strength has been defined as the ability to exert maximum force against resistance.

Muscle strengthening exercises can be classified into three categories

- ✓ Isometric exercise
- ✓ Isotonic exercise
- ✓ Isokinetic exercise

I.ISOMETRIC EXERCISE:

Isometric exercise involves muscle contraction without shortening. (there is no movement or only a minimum shortening of muscle fibers).

Duration:

The duration used in research on isometric training has varied from 3 to 100 sec. The majority studies reviewed that depart strength gains after isometric training used 6 sec contractions.

Strength training should be done for 30-45 minutes daily **Techniques**

1) ELBOW FLEXION:

Purpose : Strengthening biceps muscle of the elbow in two parts of the Range of motion

Duration *:3 minutes*

procedure *:*

Step 1 **:** Patient sitting with hips and knees flexed to $90^{0.}$

Step2 **:** Place distal hand on client's wrist and proximal hand on client's shoulder.

Step 3 : Client flexes arm as clinician provides isometric resistance to the movement with distal hand.

Step4 **:** Resistance should be held for 6-10 sec per repetition.

2) *SHOULDER ABDUCTION*

Purpose:

Strengthening abductor muscles of the shoulder in the plane of the scapula in two parts of the Range of motion

Duration: 3 minutes

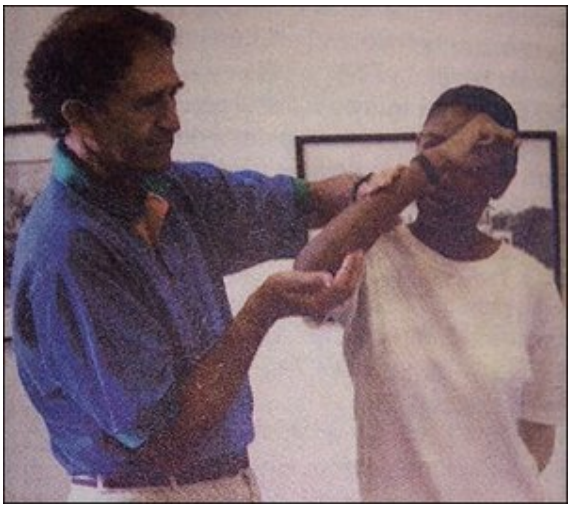
Procedure:

Step 1:

Patient sitting with hips and knees flexed at 90^0 clinician place distal hand on clients wrist and proximal hand on clients shoulder Exercise at 100^0 of shoulder abduction.

Step 2: The client arm as clinician provides isometric resistance to the movement with distal hand

Step 3: Resistance should be held for 6 to 10 sec per Repetition.



3) KNEE EXTENTION

Purpose:

Strengthening quadriceps muscles

Duration: 3 minutes

Procedure:

Step 1: client sitting with both legs flexed to 45^{0}. The left leg placed on the anterior surface of the right leg.

Step 2: The client uses leg to flex and provides isometric resistance against anterior surface of right leg.

Step 3: Right leg attempts to extend against resistance of left leg.

Step 4: Resistance should be held for 6 to 10 sec per Repetition.

4) ***ANKLE DORSIFLEXION EXERCISE***

Purpose:

Strengthening tibialis anterior muscle of the ankles

Duration: 3 minutes

Procedure:

Step 1: Patient sitting with hip and knee flexed 90^0.

Step 2: Client places right foot on anterior surface of left foot.

Step 3: The client uses right foot to plantar flex and provide resistance against anterior surface of left foot. Left foot attempts to dorsiflex against resistance of right foot

Step 4: Resistance should be held for 6 to 10 sec per repetition.

Advantages of isometric exercise:

- ❖ Workout is much faster
- ❖ Isometric exercise reduces joint pain
- ❖ Can gain strength, muscle mass and muscle tone
- ❖ Increase circulation to the exercise body part

Disadvantages of Isometric exercise

- Decreased muscular endurance
- Increased Blood pressure
- Building strength during a static contraction can potentially reduce the speed of the muscle response

II. ISOTONIC EXERCISE:

Isotonic exercise involves muscle shortening and active movement . examples includes independently performing range of motion exercises, walking.

Techniques:

1) SHOULDER EXTERNAL ROATATION:

Purpose:

Strengthening external rotator muscles of the rotator cuff of the shoulder in two different positions of shoulder abduction.

Duration : 3 minutes

Procedure:

Step 1: Client positions shoulder in a conservative position of adduction next to the Body or a more aggressive position of the shoulder of external rotation at 90^0 of abduction.

Step 2:

From an internally rotated position, client externally rotates shoulder against resistance , pauses at end range of external rotation.

Step 3: Then, slowly and with control, the client allows the arm to return to the starting position.

2) *LEG RAISE WITH CUFF WEIGH:*

Purpose:

Strengthening hip flexors using straight leg raise.

Duration : 3 minutees

Procedure:

***Step** 1:* Client lying supine with cuff weight strapped around ankle. Opposite leg may be flexed for comfort of client.

Step 2: Client raises leg, holds briefly in flexed position, and slowly lowers leg to starting position

3)*HIP ABDUCTION:*

Purpose:

Strengthening hip abductor muscles.

Duration : 3 minutes

Procedure:

Step 1: Client lying on side with cuff weight strapped around ankle of leg closes to ceiling. Opposite leg may be flexed for comfort of client.

Step 2: Client raises leg, holds briefly in abducted position, and slowly lowers the leg to starting position.

4)*HIP EXTENSION*:

Purpose:

Strengthening hamstring muscles of the knee

Duration : 3 minutes

Procedure:

Step 1: Client lying prone with leg held over edge of plinth.

Step 2: Cuff weight strapped around ankle.

Step3: Client slowly lowers leg to the floor. After a brief pause client lifts leg into hip extension.

5)*KNEE EXTENSION*:

Purpose:

Strengthening quadriceps muscles of the knee in a limited or protected Range of motion

Duration : 3 minutes

Procedure:

Step 1: Client lying supine with cuff weight strapped around ankle.

Step 2: Towel roll is placed under client's knee allowing a limited Range of motion.

Step 3: Client extends knee through partial range of motion Once fully extended client pauses briefly, holding knee in extended position and then slowly lowers leg with control from full extension.

BENEFITS:

- ❖ increased muscle mass, muscle tone, and strength
- ❖ improved joint mobility
- ❖ increased cardiac and respiratory function
- ❖ increased circulation

III. ISOKINETIC EXERCISE:

Isokinetic exercise involves muscle contractions with resistance, varying at a constant rate produced by a device with a capacity for variable resistance

QUADRICEPS *EXERCISES FOR KNEE AND HIP:*

Duration : 3 minutes

Procedure :

Step 1: while in seated position on a chair with legs fully extended ,make the thigh muscles tightened trying to push back the knee down towards the floor.

Step 2: Hold for 10 seconds, relax and then repeat.

தசை வலிமை உடற்பயிற்சிகள்

நோக்கம்:

- ❖ உடற்பயிற்சி மூட்டு வலி, மூட்டு விரைப்புத்தன்மையைக் குறைக்கிறது.
- ❖ வளைந்து கொடுக்கும் தன்மையை அதிகரிக்கிறது.
- ❖ தசையை வலிமைப்படுத்துகிறது.
- ❖ உடல் நலத்தை பேணி பாதுகாக்கிறது.

தசை வலிமை உடற்பயிற்சி:

தசை வலிமை என்பது எதிர்ப்புத்தன்மைக்கு எதிராக உடற்பயிச்சி செய்வதே ஆகும். தசை வலிமை உடற்பயிற்சியில் மூன்று உடற்பயிற்சிகள் உள்ளன.

- ❖ ஐசோமெட்ரிக் உடற்பயிற்சி
- ❖ ஐசோடோனிக் உடற்பயிற்சி
- ❖ ஐசோகைனட்டிக் உடற்பயிற்சி

I. ஐசோமெட்ரிக் உடற்பயிற்சி:

ஐசோமெட்ரிக் உடற்பயிற்சி என்பது தசைகளை சுருக்குதலே ஆகும்.

கால அளவு:

3 முதல் 100 நொடிகள் செய்ய வேண்டும். தசை வலிமை உடற்பயிற்சி தினமும் காலை மற்றும் மாலையில் 30-45 நிமிடங்கள் உடற்பயிற்சி செய்ய வேண்டும்.

செய்முறைகள்:

1) **முழங்க்கைகளை மடக்கும் உடற்பயிற்சி:**

நோக்கம்:முழங்கை தசையை வலிமைப்படுத்துகிறது

கால அளவு: 3 நிமிடங்கள்.

செய்முறை:

- முழங்கை 90^0 அளவிற்கு மடக்கி அமர வேண்டும்
- பயிற்சியாளர் ஒரு கையால் நோயளியின் மணிக்கட்டையும்,மறு கையால் தோல்பட்டையும் பிடிக்க வேண்டும்.
- உடற் பயிற்சி செய்யும் பொழுது பயிற்சியாளர் அதற்கு எதிர் திசையில் சுமார் 6-10 நொடிகள் எதிர்ப்புக் கொடுக்க வேண்டும்.

2. தோல்ப்பட்டையை மடக்கும் உடற்பயிற்சி:

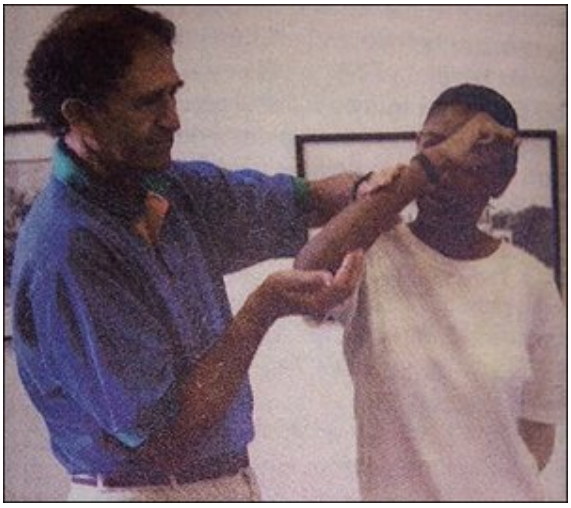
நோக்கம் : தோல்பட்டைத் தசைகளை வலிமைப்படுத்துகிறது.

கால அளவு : 3 நிமிடங்கள்.

செய்முறை:

- பயிற்சியாளர் ஒரு கையால் நோயாளியின் மணிக்கட்டையம், மறு கையால் தோல்பட்டைட்டையும் 100^0 உயர்த்த வேண்டும்.
- தோல் பட்டையை 100^0 க்கு உயர்த்தும் பொழுது எதிர்ப்புக் கொடுக்க வேண்டும்.

- சுமார் 6-10 நொடிகள் எதிர்ப்புக் கொடுக்க வேண்டும்



3. முழங்காலை நீட்டுதல்:

நோக்கம்: முழங்கால் தசையை வலிமைப்படுத்துகிறது

கால அளவு: 3 நிமிடங்கள்

செய்முறை:

- இரண்டு கால்களையும் 45^0 மடக்கி அமர வேண்டும். இடது காலை வலது காலின் மேல் வைத்து அமர வேண்டும்
- பயிற்சியாளர் வலது காலில் எதிர்ப்பத்தன்மைக் நோயாளி காலை மடக்கும் பொழுது கொடுக்க வேண்டும்.
- வலது கால் எதிர்ப்பத் தன்மைக்க எதிராக அகற்ற லேவண்டும்.
- எதிர்ப்புத்தன்மையை சுமார் 6-10 நொடிகள் கொடுக்க வேண்டும்.

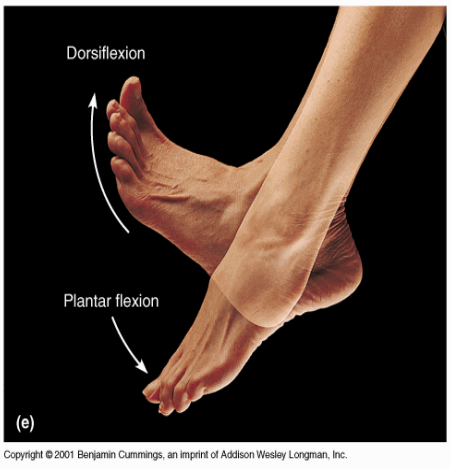
4. கணுக்காலை கீழ்நோக்கி உயர்த்தும் உடற்பயிற்சி:

நோக்கம்: தசைகளை வலிமைப்படுத்துகிறது.

கால அளவு : 3 நிமிடங்கள்

செய்முறை:

- ❖ இடுப்பு மற்றும் முழங்காலை 90^0 மடக்கி அமர வேண்டும்.
- ❖ நோயாளி வலது பாதத்தை இடது பாதத்தின் மேல் வைக்க வேண்டும்.
- ❖ நோயாளி வலது பாதத்தை கீழ்நோக்கி செல்லும் பொழுது பயிற்சியாளர் அதற்கு எதிர்திசையில் எதிர்ப்பு தர வேண்டும். இடது கால் எதிர்ப்புத்தன்மைக்கு எதிராக மேல் நோக்கி செல்லும்.
- ❖ 6 - 10 நொடிகள் எதிர்ப்புத்தன்மை கொடுக்க வேண்டும்.



நன்மைகள் :-

- ➢ மூட்டு வலியைக் குறைக்கிறது
- ➢ தசை வலிமையை அதிகரிக்கிறது
- ➢ இரத்த ஓட்டத்தை அதிகரிக்கிறது.

தீமைகள் :-

- இரத்த அழுத்தத்தை அதிகரிக்கிறது
- தசையின் வேகத்தைக் குறைக்கிறது.

ஐசோடோனிக் உடற்பயிற்சி :-

ஐசோடோனிக் உடற்பயிற்சி என்பது வலுவான அசைவுகளுடன் தசைகளை சிறிதாக்குதல்.

எடுத்துக்காட்டு : நடைபயிற்சி.

செய்முறைகள் :-

1) தோல்பட்டையை வெளிப்புறமாக சுழற்றும் உடற்பயிற்சி நோக்கம்:-

வெளிப்புறமாக சுழற்றும் தோல்பட்டை தசைகளை வலிமைப்படுத்துகிறது.

கால அளவு : 3 நிமிடங்கள்.

செய்முறை :-

- தோல்பட்டையை 90^0 அளவிற்கு நீட்ட வேண்டும்.
- உட்புறத்திலிருந்து வெளிப்புறமாக சுழற்றும்பொழுது எதிர்ப்புதன்மையைக் கொடுக்க வேண்டும்.
- பிறகு, மெதுவாக தொடக்க நிலைக்கு வரவேண்டும்.

2. கால்களை உயர்த்தும் உடற்பயிற்சி :-

நோக்கம் :-

இடுப்பை மடக்கும் தசையை வலிமைப்படுத்துகிறது.

கால அளவு : 3 நிமிடங்கள்

செய்முறை :-

- நோயாளியை நேராக படுக்க வைத்து, பிறகு துணியால் கணுக்காலை கட்ட வேண்டும். மறு காலை மடக்கி வைக்க வேண்டும்.
- நோயாளி காலை உயர்த்திய நிலையில் இருந்து பின்னர் தொடக்க நிலைக்கு கொண்டு வர வேண்டும்.

3. இடுப்பை உயர்த்தும் உடற்பயிற்சி :-

நோக்கம் : தசையை வலிமைப்படுத்துகிறது

கால அளவு :3 நிமிடங்கள்.

செய்முறை :-

- நோயாளியை ஒருபுறமாக சாயத்து படுக்க வைக்க வேண்டும். ஒரு துணியால் கணுக்காலை இறுக்கமாக கட்ட வேண்டும். மறுகாலை நோயாளிக்கு சவுகரியமாக மடக்க வேண்டும்.

- நோயாளி துணியால் கட்டப்பட்ட காலை உயர்த்தி சிறிது நேரம் கழித்து தொடக்க நிலைக்கு கொண்டு வர வேண்டும்.

4. இடுப்பு பகுதியை நீட்டும் உடற்பயிற்சி :-

நோக்கம் :-

இடுப்புத்தசைகளை வலிமை படுத்துகிறது.

கால அளவு :-

மூன்று நிமிடங்கள்

செய்முறை :-

- நோயாளியை குப்புறமாக படுக்கையின் விளிம்பில் படுக்க வைக்க வேண்டும்.
- ஒரு துணியால் கணுக்காலை இறுக்கமாக கட்ட வேண்டும்.
- நோயாளியின் ஒரு காலை மெதுவாக தரைதளத்திற்கு கொண்டுவர வேண்டும். சிறிது நேரத்திற்கு பிறகு நோயாளி தனது காலை இடுப்பு பகுதிக்கு நேராக நீட்ட வேண்டும்.

5. முழங்காலை நீட்டும் உடற்பயிற்சி :-

நோக்கம் :-

முழங்கால் தசைகளை வலிமைபடுத்துகிறது.

கால அளவு :-

3 நிமிடங்கள்

செய்முறை :-

- நோயாளியை நேராக படுக்க வைக்க வேண்டும் பிறகு கணுக்காலை துணியால் இறுக்கமாக கட்ட வேண்டும்.
- நோயாளியின் கால் சிறிது அசைவிற்கு ஏற்றவாறு துவாலையை முழங்கால்களுக்கு கீழ்புறமாக வைக்க வேண்டும்.
- நோயாளி காலை சிறிது அசைவிற்கு ஏற்றவாறு மெதுவாக நீட்டி முழுவதுமாக நீட்டிய பிறகு சிறிது நேரம் கழித்து அந்த நிலையில் இருந்து காலை மெதுவாக தொடக்க நிலைக்கு கொண்டுவர வேண்டும்.

பயன்கள் :-

- ✓ முழங்கால் தசைகளை வலுப்படுத்துகிறது.
- ✓ முழங்கால் அசைவுகளை அதிகரிக்கிறது.
- ✓ இதன் மூலம் இதயம் மற்றும் சுவாச மண்டல வேலையை அதிகரிக்கிறது.
- ✓ இரத்த - ஓட்டத்தை அதிகரிக்கிறது.

III. ஐசோகைனட்டிக் உடற்பயிற்சி:

நோயாளியை நாற்காலியின் மேல் உட்கார வைத்து நேயாளியின் காலை முழுவதுமாக நேராக நீட்டிய பிறகு தொடை தசையை இறுக்கி முழங்காலை தரைக்க இணையாக பின்புறமாக இழுக்க வேண்டும். 10 நொடிகளுக்கு பிறகு அந்த நிலையிலிருந்து விடுபட்டு மீண்டும் இந்த பயிற்சியினை தொடர்ந்து 3 நிமிடம் வரை செய்யவேண்டும். இந்த உடற்பயிச்சியை 3 நிமிடமாக, காலையும் மாலையும் 30 நாட்களுக்கு தொடர்ந்து செய்ய வேண்டும்.

APPENDIX – I

PHOTOS